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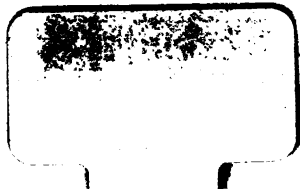
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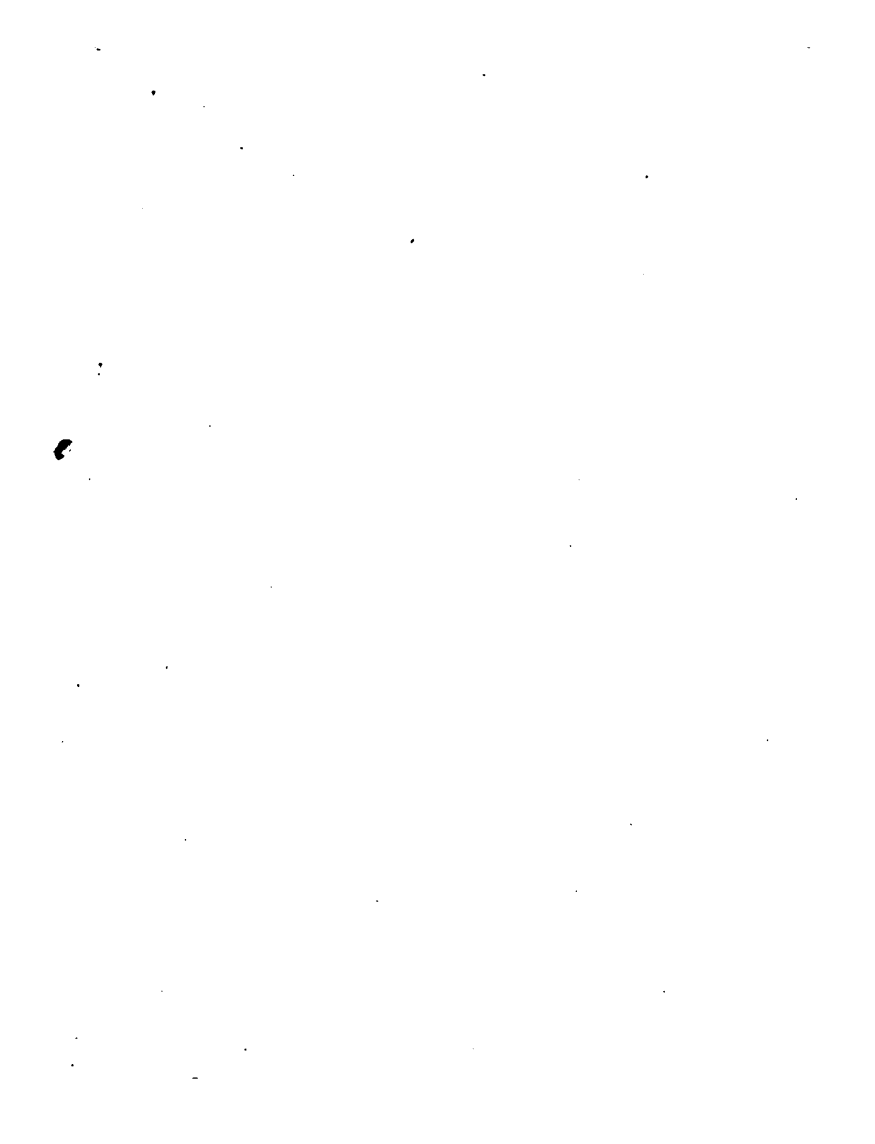
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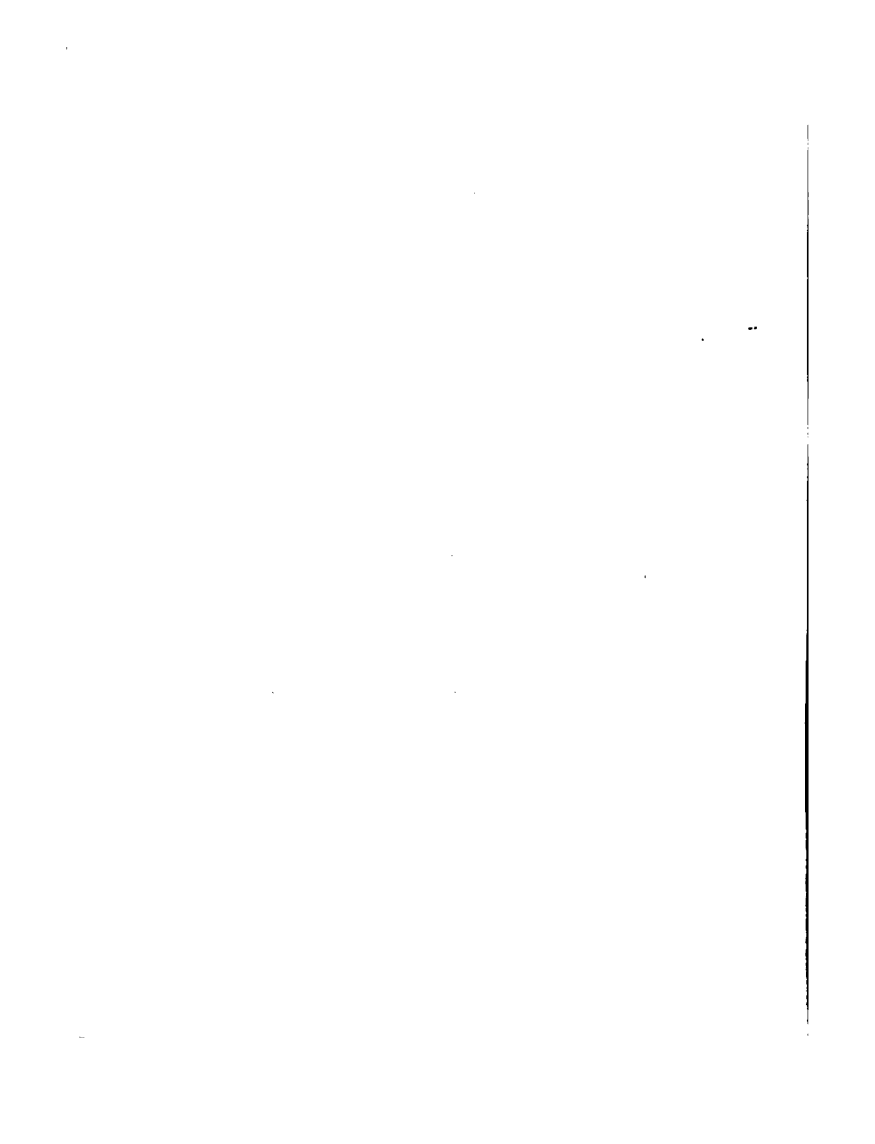
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U. S. WAR DEPARTMENT

11

MANUAL
FOR
Noncommissioned Officers and Privates
OF
FIELD ARTILLERY
OF
THE ARMY OF THE UNITED STATES

1917

Corrected to December 31, 1917
(Changes No. 1)

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WAR DEPARTMENT,

WASHINGTON, *June 16, 1917.*

The following Manual for Noncommissioned Officers and Privates of Field Artillery of the Army of the United States is approved and herewith published for the information and government of all concerned.

[2582824 A. G. O.]

BY ORDER OF THE SECRETARY OF WAR:

TASKER H. BLISS,

Major General, Acting Chief of Staff.

OFFICIAL:

H. P. MCCAIN.

The Adjutant General.

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MANUAL
FOR
NONCOMMISSIONED OFFICERS AND PRIVATES
OF
FIELD ARTILLERY
OF THE
ARMY OF THE UNITED STATES.

CHAPTER I.
MILITARY DISCIPLINE AND COURTESY.

Section 1. Oath of enlistment.

Every soldier on enlisting in the Army takes upon himself the following obligation:

"I, _____, do solemnly swear (or affirm) that I will bear true faith and allegiance to the United States of America; that I will serve them honestly and faithfully against all their enemies whomsoever; and that I will obey the orders of the President of the United States, and the orders of the officers appointed over me according to the Rules and Articles of War." (109th Article of War.)

Section 2. Obedience.

The very first paragraph in the Army Regulations reads:

"All persons in the military service are required to **obey strictly** and to **execute promptly** the lawful orders of their superiors."

Obedience is the first and last duty of a soldier. It is the foundation upon which all military efficiency is built. Without it an army becomes a mob, while with it a mob ceases to be a mob and becomes possessed of much of the power of an organized force. It is a quality that is demanded of every person in the Army, from the highest to the lowest. Each enlisted man binds himself, by his enlistment oath, to obedience. Each officer, in accepting his commission, must take upon himself the same solemn obligation.

Obey strictly and execute promptly the lawful orders of your superiors. It is enough to know that the person giving the order, whether he be an officer, a noncommissioned officer, or a private acting as such, is your lawful superior. You may not like him, you may not respect him, but you must respect his position and authority, and reflect honor and credit upon yourself and your profession by yielding to all superiors that complete and unhesitating obedience which is the pleasure as well as the duty of every true soldier.

Orders must be strictly carried out. It is not sufficient to comply with only that part which suits you or which involves no work or danger or hardship. Nor is it proper or permissible, when you are ordered to do a thing in a certain way or to accomplish a work in a definitely prescribed manner, for you to obtain the same results by other methods.

Obedience must be prompt and unquestioning. When any soldier (and this word includes officers as well as enlisted men) receives an order, it is not for him to consider whether the order is a good one or not, whether it would have been better had such an order never been given, or whether the duty might be better performed by some one else, or at some other time, or in some other manner. His duty is, first, to understand just what the order requires, and, second, to proceed at once to carry out the order to the best of his ability.

"Officers and men of all ranks and grades are given a certain independence in the execution of the tasks to which they are assigned and are expected to show initiative in meeting the different situations as they arise. Every individual, from the highest commander to the lowest private, must always remember that inaction and neglect of opportunities will warrant more severe censure than an error in the choice of the means."
(Preface, Field Service Regulations.)

Section 3. Loyalty.

But even with implicit obedience you may yet fail to measure up to that high standard of duty which is at once the pride and glory of every true soldier. Not until you carry out the desires and wishes of your superiors in a hearty, willing, and cheerful manner are you meeting all the requirements of your profession. For an order is but the will of your superior, however it may be expressed. Loyalty means that you are for your organization and its officers and noncommissioned officers—not against them; that you always extend your most earnest and hearty support to those in authority. No soldier is a loyal soldier who is a knocker or a grumbler or a shirker. Just one man of this class in a company breeds discontent and dissatisfaction among many others. You should, therefore, not only guard against doing such things yourself but should discourage such actions among any of your comrades.

Section 4. Discipline.

"1. All persons in the military service are required to obey strictly and to execute promptly the lawful orders of their superiors.

"2. Military authority will be exercised with firmness, kindness, and justice. Punishments must conform to law and follow offenses as promptly as circumstances will permit.

"3. Superiors are forbidden to injure those under their authority by tyrannical or capricious conduct or by abusive language. While maintaining discipline and the thorough and prompt performance of military duty, all officers, in dealing

with enlisted men, will bear in mind the absolute necessity so treating them as to preserve their self-respect. Officers will keep in as close touch as possible with the men under the command and will strive to build up such relations of confidence and sympathy as will insure the free approach of their men to them for counsel and assistance. This relationship may be gained and maintained without relaxation of the bonds of discipline and with great benefit to the service as a whole.

"4. Courtesy among military men is indispensable to discipline; respect to superiors will not be confined to obedience on duty, but will be extended on all occasions.

"5. Deliberations or discussions among military men conveying praise or censure, or any mark of approbation, toward others in the military service, and all publications relating to private or personal transactions between officers are prohibited. Efforts to influence legislation affecting the Army or to procure personal favor or consideration should never be made except through regular military channels; the adoption of any other method by any officer or enlisted man will be noted in the military record of those concerned." (*Army Regulations.*)

"The discipline which makes the soldier of a free country reliable in battle is not to be gained by harsh or tyrannical treatment. On the contrary, such treatment is far more likely to destroy than to make an army. It is possible to impart instruction and give commands in such manner and in such tone of voice as to inspire in the soldier no feeling but an intense desire to obey, while the opposite manner and tone of voice can not fail to excite strong resentment and a desire to disobey. The one mode or the other of dealing with subordinate springs from a corresponding spirit in the breast of the commander. He who feels the respect which is due to others can not fail to inspire in them regard for himself, while he who feels, and hence manifests, disrespect toward others, especially his inferiors, can not fail to inspire hatred against himself." (*Address of Maj. Gen. John M. Schofield to the United States Corps of Cadets, Aug. 11, 1879.*)

When, by long-continued drill and subordination, you have learned your duties, and obedience becomes second nature, you have acquired discipline. It can not be acquired in

day nor a month. It is a growth. It is the habit of obedience. To teach this habit of obedience is the main object of the close-order drill, and, if good results are to be expected, the greatest attention must be paid to even the smallest details. The company or squad must be formed promptly at the prescribed time—not a minute or even a second late. All must wear the exact uniform prescribed and in the exact manner prescribed. When at attention there must be no gazing about, no raising of hands, no chewing or spitting in ranks. The manual of arms and all movements must be executed absolutely as prescribed. A drill of this kind teaches discipline. A careless, sloppy drill breeds disobedience and insubordination. In other words, discipline simply means efficiency.

Section 5. Military Courtesy.

In all walks of life men who are gentlemanly and of good breeding are always respectful and courteous to those about them. It helps to make life move along more smoothly. In civil life this courtesy is shown by the custom of tipping the hat to ladies, shaking hands with friends, and greeting persons with a nod or a friendly "Good morning," etc.

In the Army courtesy is just as necessary, and for the same reasons. It helps to keep the great machine moving without friction.

"Courtesy among military men is indispensable to discipline; respect to superiors will not be confined to obedience on duty, but will be extended on all occasions." (*Par. 4, Army Regulations, 1913.*)

One method of extending this courtesy is by saluting. When in ranks the question of what a private should do is simple—he obeys any command that is given. It is when out of ranks that a private must know how and when to salute.

Section 6. Saluting.

In the old days the free men of Europe were all allowed to carry weapons, and when they met each would hold up his right hand to show that he had no weapon in it and that they met as friends. Slaves or serfs, however, were not allowed to

carry weapons, and slunk past the free men without making any sign. In this way the salute came to be the symbol or sign by which soldiers (free men) might recognize each other. The lower classes began to imitate the soldiers in this respect, although in a clumsy, apologetic way, and thence crept into civil life the custom of raising the hand or nodding as one passed an acquaintance. The soldiers, however, kept their individual salute, and purposely made it intricate and difficult to learn in order that it could be acquired only by the constant training all real soldiers received. To this day armies have preserved their salute, and when correctly done it is at once recognized and never mistaken for that of the civilian. All soldiers should be careful to execute the salute exactly as prescribed. The civilian or the imitation soldier who tries to imitate the military salute, invariably makes some mistake which shows that he is not a real soldier; he gives it in an apologetic manner, he fails to stand or march at attention, his coat is unbuttoned or hat on awry, or he fails to look the person saluted in the eye. There is a wide difference in the method of rendering and meaning between the civilian salute as used by friends in passing, or by servants to their employers, and the MILITARY SALUTE, the symbol and sign of the military profession.

To salute with the hand, first assume the position of a soldier or march at attention. Look the officer you are to salute straight in the eye. Then, when the proper distance separates you, raise the right hand smartly till the tip of the forefinger touches the lower part of the forehead or forehead above the right eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45° , hand and wrist straight. Continue to look the officer you are saluting straight in the eye and keep your hand in the position of salute until the officer acknowledges the salute or until he has passed. Then drop the hand smartly to the side. The salute is given with the right hand only.

To salute with the rifle, bring the rifle to right shoulder arms if not already there. Carry the left hand smartly to the small of the stock, forearm horizontal, palm of the hand down, thumb and fingers extended and joined, forefinger touching the end of the cocking piece. Look the officer saluted in the eye. When

the officer has acknowledged the salute or has passed, drop the left hand smartly to the side and turn the head and eyes to the front. The rifle salute may also be executed from the order or trail. See paragraph 94, Infantry Drill Regulations, and paragraph 111, Cavalry Drill Regulations, 1916.

To salute with the saber, bring the saber to order saber if not already there, raise and carry the saber to the front, base of the hilt as high as the chin and 6 inches in front of the neck, edge to the left, point 6 inches farther to the front than the hilt, thumb extended on the left of the grip, all fingers grasping the grip. Look the officer saluted in the eye. When the officer has acknowledged the salute or has passed, lower the saber, point in prolongation of the right foot and near the ground, edge to the left, hand by the side, thumb on left of grip, arm extended, and return to the order saber. If mounted, the hand is held behind the thigh, point a little to the right and front of the stirrup.

(For Cavalry.) To salute with the saber, bring the saber to carry saber if not already there, carry the saber to the front with arm half extended until the thumb is about 6 inches in front of the chin, the blade vertical, guard to the left, all four fingers grasping the grip, the thumb extending along the back in the groove, the fingers pressing the back of the grip against the heel of the hand. Look the officer saluted in the eye. When the officer has acknowledged the salute or has passed, bring the saber down with the blade against the hollow of the right shoulder, guard to the front, right hand at the hip, the third and fourth finger on the back of the grip and the elbow back.

The pistol is not carried in the hand but in the holster, therefore when armed with the pistol salute with the hand.

Always stand or march at attention before and during the salute. The hat should be on straight, coat completely buttoned up, and hands out of the pockets.

Section 7. Rules Governing Saluting.

"382. (1) Salutes shall be exchanged between officers and enlisted men not in a military formation, nor at drill, work, games, or mess, on every occasion of their meeting, passing near,

or being addressed, the officer junior in rank or the enlisted man saluting first.

"(2) When an officer enters a room where there are several enlisted men, the word "attention" is given by some one who perceives him, when all rise, uncover, and remain standing at attention until the officer leaves the room or directs otherwise. Enlisted men at meals stop eating and remain seated at attention.

"(3) An enlisted man, if seated, rises on the approach of an officer, faces toward him, stands at attention, and salutes. Standing, he faces an officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease work to salute an officer unless addressed by him.

"(4) Before addressing an officer, an enlisted man makes the prescribed salute with the weapon with which he is armed, or, if unarmed, with the right hand. He also makes the same salute after receiving a reply.

"383. (1) In uniform covered or uncovered, but not in formation, officers and enlisted men salute military persons as follows: With arms in hand, the salute prescribed for that arm (sentinels on interior guard duty excepted); without arms, the right-hand salute.

"(2) In civilian dress covered or uncovered, officers and enlisted men salute military persons with the right-hand salute.

"(3) Officers and enlisted men will render the prescribed salutes in a military manner, the officer junior in rank or the enlisted man saluting first. When several officers in company are saluted, all entitled to the salute shall return it.

"(4) Except in the field under campaign or simulated campaign conditions, a mounted officer (or soldier) dismounts before addressing a superior officer not mounted.

"(5) A man in formation shall not salute when directly addressed, but shall come to attention if at rest or at ease.

"384. (1) Saluting distances is that within which recognition is easy. In general, it does not exceed 30 paces.

"(2) When an officer entitled to the salute passes in rear of a body of troops it is brought to attention while he is opposite the post of the commander.

“(8) In public conveyances, such as railway trains and street cars, and in public places, such as theaters, honors and personal salutes may be omitted when palpably inappropriate or apt to disturb or annoy civilians present.

“392. Soldiers at all times and in all situations pay the same compliments to officers of the Army, Navy, Marine Corps, and Volunteers, and to officers of the National Guard in uniform as to officers of their own regiment, corps, or arm of service.

“386. Sentinels on post doing interior guard duty conform to the foregoing principles, but salute by presenting arms when armed with the rifle. They will not salute if it interferes with the proper performance of their duties. Troops under arms will salute as prescribed in drill regulations.

“387. (1) Commanders of detachments or other commands will salute officers of grades higher than the person commanding the unit by first bringing the unit to attention and then saluting as required in subparagraph 1 of paragraph 383. If the person saluted is of a junior or equal grade the unit need not be at attention in the exchange of salutes.

“(2) If two detachments or other commands meet, their commanders will exchange salutes, both commands being at attention.

“388. Salutes and honors as a rule are not paid by troops actually engaged in drill, on the march, or in the field under campaign or simulated campaign conditions. Troops on the service of security pay no compliments whatever.

“389. If the command is in line at a halt (not in the field) and armed with the rifle, or with sabers drawn, it shall be brought to “present arms” or “present sabers” before its commander salutes in the following cases: When the national anthem is played, or when “To the Color” or “To the Standard” is sounded during ceremonies, or when a person is saluted who is its immediate or higher commander or a general officer, or when the national or regimental color is saluted.

“390. At parades and other ceremonies, under arms, the command shall render the prescribed salute and shall remain in the position of salute while the national anthem is being played; also at retreat and during ceremonies when “To the Color” is played if no band is present. If not under arms, the organiza-

tions shall be brought to attention at the first note of the national anthem, "To the Color," or "To the Standard," and the salute rendered by the officer or noncommissioned officer in command as prescribed in regulations, as amended herein.

"378. Whenever the national anthem is played at any place when persons belonging to the military service are present, all officers and enlisted men not in formation shall stand at attention facing toward the music (except at retreat, when they shall face toward the flag). If in uniform, covered, they shall salute at the first note of the anthem, retaining the position of salute until the last note of the anthem. If not in uniform and covered, they shall uncover at the first note of the anthem, holding the headdress opposite the left shoulder and so remain until its close, except that in inclement weather the headdress may be held slightly raised.

"The same rules apply when 'To the Color' or 'To the Standard' is sounded as when the national anthem is played.

"When played by an Army band, the national anthem shall be played through without repetition of any part not required to be repeated to make it complete.

"The same marks of respect prescribed for observance during the playing of the national anthem of the United States shall be shown toward the national anthem of any other country when played upon official occasions. (*C. M. N. C. O. and P. of F. A. No. 1.*)

"385. Substitute the following: (1) Salutes to the national anthem or when 'To the Color' (or 'Standard') is sounded during ceremonies will be as prescribed in regulations, as herein amended.

"(2) Officers and enlisted men passing the uncased color will render honors as follows: If in uniform they will salute as required in subparagraph 1 of paragraph 383; if in civilian dress and covered they will uncover, holding the headdress opposite the left shoulder with the right hand; if uncovered they will salute with the right-hand salute." (*Army Regulations, 1913.*)

The national flag belonging to dismounted organizations is called a color; to mounted organizations, a standard. An uncased color is one that is not in its waterproof cover.

Privates do not salute noncommissioned officers. Prisoners are not permitted to salute; they merely come to attention if not actually at work. The playing of the national anthem as a part of a medley is prohibited in the military service.

Section 8. Courtesies in Conversation.

In speaking to an officer, always stand at attention and use the word "Sir." Examples:

"Sir, Private Brown, Company B, reports as orderly."

"Sir, the first sergeant directed me to report to the captain."

(Question by an officer:) "To what company do you belong?"

(Answer:) "Company H, sir."

(Question by an officer:) "Has first call for drill sounded?"

(Answer:) "No, sir;" or "Yes, sir; it sounded about five minutes ago."

(Question by an officer:) "Can you tell me, please, where Major Smith's tent is?"

(Answer:) "Yes, sir; I'll take you to it."

Use the third person in speaking to an officer. Examples:

"Does the Lieutenant wish," etc.

"Did the Captain send for me?"

In delivering a message from one officer to another, always use the form similar to the following: Lieutenant A presents his compliments to Captain B and states," etc. This form is not used when the person sending or receiving the message is an enlisted man.

In all official conversation refer to other soldiers by their titles, thus: Sergeant B, Private C.

CHAPTER II.

ARMS, UNIFORMS, AND EQUIPMENT.

Section 1. Field Artillery, Types of.

(A) CLASSIFICATION.

	Caliber.	Designation.	Weight of projectile.	Weight behind team.
			<i>Pounds.</i>	<i>Pounds.</i>
Light.....	3-inch.....	Mountain howitzer.....	15	(¹)
Do.....	do.....	Field gun.....	15	4, 200
Do.....	3.8-inch.....	Howitzer.....	30	4, 200
	4.7-inch.....	do ²	60	5, 200
Heavy.....	do.....	Field gun.....	60	8, 750
Do.....	6-inch.....	Howitzer.....	120	8, 000

¹ Packed on mules, about 300 pounds each.

² Classed as light field artillery when horsed with a team of four pairs, and as heavy field artillery when horsed with a team of three pairs.

(B) GENERAL DESCRIPTION.

The field artillery of the United States Army is of the true rapid-fire type, the principal characteristics of which are (a) control of recoil, by means of which the piece remains practically undisturbed under the shock of discharge, thus facilitating loading, aiming, and firing; (b) sighting apparatus, by means of which the pieces may be directed accurately upon a target which is concealed from view of the guns by intervening obstacles; (c) means for obtaining a considerable angle of eleva-

tion for the piece itself without altering the position of the carriage, thus increasing the range; (d) means for changing the direction of the gun, within certain limits, without shifting the whole carriage, thus enabling a quick change from one target to another to be made; (e) fixed ammunition, similar in form to the familiar small-arms cartridge.

A field gun or howitzer may be considered as being composed of the following principal parts: The gun, the breech mechanism, and the carriage.

The gun consists roughly of: Means for attaching the breech mechanism; the chamber or seat for the powder charge and projectile; means of confining the powder gases and forcing them to act in the proper direction as they expand, and of forcing the projectile, as it leaves the bore, to take the direction desired.

The breech mechanism comprises roughly the breech block, operating lever, firing mechanism, extractor, and safety device.

It provides means for opening and closing the chamber; for firing the piece; for preventing the piece from being fired unless the breech block is locked; for confining the powder charge and projectile against movement to the rear when the piece is discharged; and for ejecting the empty case after firing.

The carriage consists, in a general way, of the cradle, the rocker, the sighting arrangement, the trail, the shields, and the wheels and axle.

It provides means for rendering the carriage stable by controlling the recoil and forcing the piece back into firing position after discharge; for elevating and traversing the piece; for sighting and laying the piece; for protecting the cannoneers against rifle and shrapnel bullets; and for transporting the piece.

In addition to the 4 guns or howitzers in a battery there are 12 caissons, 16 limbers, a battery wagon, a store wagon, a forge limber, and a store limber. The caissons and limbers are two-wheeled vehicles provided with chests divided into compartments for carrying ammunition. In the 4.7-inch gun and 6-inch howitzer batteries the piece limbers are not provided with chests, but are used solely for carrying part of the weight of the gun, which, for traveling, is retracted to such a position that a considerable proportion of its weight is supported by

its limber. The wagons and forge and store limbers are provided with chests for carrying accessories, equipment, and spare parts.

Field guns are distinguished from howitzers by their greater range, greater muzzle velocity, flatter trajectory, and somewhat greater rate of fire. The flat trajectory of the field gun renders it very effective against targets not protected by overhead cover or relatively steep masks. But for the latter class of targets, which can be reached only from above, howitzers are necessary.

Howitzers are distinguished from field guns by their individual characteristics of curved and zone fire. By firing a projectile at a relatively high angle of elevation, a greater angle of fall is obtained as it strikes the intended object, and this characteristic makes the howitzer especially valuable in penetrating overhead cover or other targets which can be reached only from above. By varying the amount of the powder charge and the angles of elevation at which howitzers are fired, objects at varying ranges may be reached at such an angle of fall as to produce the desired effect.

Howitzers are further distinguished from field guns by two distinctive features of design:

(1) In the howitzer, on account of the short trail and high angles of elevation, the gun is placed underneath the cradle, with the object of reducing the overturning tendency at the end of the trail and rendering the carriage stable under all conditions of loading and elevation; while in the field gun the gun is placed above the cradle.

(2) In the howitzer the amount of recoil varies for different elevations and is automatically regulated, so that the higher the elevation the shorter the recoil will be; while in the field gun the length of recoil is practically the same for all elevations.

(C) AMMUNITION.

The projectiles supplied for field artillery are of two general classes, shrapnel and shell. The weight of each projectile is the same for each caliber, and is as shown in (A) above. A complete round of ammunition consists of the cartridge case, the primer, the powder (propelling) charge, and the projectile. The propelling charge is of smokeless powder.

The **shrapnel** consists roughly of a hollow steel case with a solid base, fitted with a base bursting charge of black powder, a filling of shrapnel balls held in place by a smoke-producing composition, and closed by a combination fuse. The fuse may be so set as to cause the shrapnel to burst in the air at any desired distance from the gun or on impact. When the shrapnel bursts in air the bursting charge strips off the head of the case and sends the shrapnel balls out of the case with an added velocity and scatters them to the front, somewhat in the same manner that shot is expelled from a shotgun cartridge. The smoke-producing composition is ignited when the shrapnel bursts and produces a white ball of smoke which aids in observation. The velocity of the shrapnel balls is sufficient to disable man or beast at ranges from the point of burst varying from 200 yards for the longer ranges to 500 yards for mid and short ranges. The proper height of burst above the line joining gun and target is assumed to be such as will give at least one ball for every square yard of a vertical target. When a shrapnel bursts on impact the effect is somewhat similar to that of a shell. Shrapnel is used in general against animate targets, such as men and horses.

The **shell** consists of a solid head steel case, hollowed out for a bursting charge and fitted at the base with a detonating fuse. The bursting charge is of high explosive. The fuse detonates on impact, exploding the bursting charge, which in turn breaks the case into pieces which are thrown in every direction. Shell may be also fitted with delay-action fuses which permit the shell to penetrate the object to a certain extent before exploding. Shell is generally used against inanimate targets, such as intrenchments, overhead cover, matériel, etc.

Ammunition may be further classified as **fixed** and **semifixed**. **Fixed** ammunition is that in which the projectile is assembled to the cartridge case containing the propelling charge and primer. The familiar commercial small-arms cartridge is an example of fixed ammunition.

Semifixed ammunition is that in which the cartridge case containing the propelling charge and primer is carried separately from the projectile itself, separate compartments being provided in the ammunition chests for each. This is necessary for howitzers on account of the varying powder charge used

for the different zones. The powder charge is assembled in the cartridge case in three parts, each in a raw-silk bag. For outer zone ranges the full powder charge is used. For the middle zone the top bag is removed and discarded before the cartridge case is inserted in the chamber; while for the inner zone the top and middle bags are removed.

All field guns, except the very heavy types, use fixed ammunition, while howitzers use semifixed ammunition.

(D) TRANSPORTATION OF MATÉRIEL AND PERSONNEL.

Light field artillery in general is horsed with teams of three pairs each, and the cannoneers are mounted on the carriages. Horse artillery is armed with the 3-inch field gun, but secures increased mobility by mounting the cannoneers on saddle horses instead of on the carriages.

Heavy field artillery is drawn by teams of four pairs or by tractors. Cannoneers of heavy batteries, except when moving over level ground and smooth roads or drawn by motor traction, are dismounted and march on foot. Noncommissioned officers, except gunners, and certain specialists are individually mounted on saddle horses in all horse-drawn artillery. In tractor-drawn artillery all the personnel are transported on motor-propelled vehicles or on the carriages.

Section 2. The Pistol.

The small arm used by the Field Artillery is the automatic pistol, caliber .45, model of 1911. The magazine may be charged with any number of cartridges from one to seven. For a detailed description of the pistol, see Ordnance Department Publication No. 1866.

IMPORTANT POINTS.

(1) Never place the trigger finger within the trigger guard until it is intended to fire and the pistol is pointed toward the target.

(2) Do not carry the pistol in the holster with the hammer cocked and safety lock on, except in an emergency.

If the pistol is so carried in the holster, cocked and safety lock on, the butt of the pistol should be rotated away from the

body when withdrawing the pistol from the holster, in order to avoid displacing the safety lock.

(3) The trigger should be pulled with the forefinger. If the trigger is pulled with the second finger, the forefinger extending along the side of the receiver is apt to press against the projecting pin of the slide stop and cause a jam when the slide recoils.

(4) Care must be exercised in inserting the magazine to insure its engaging with the magazine catch.

(5) Pressure must be entirely relieved from the trigger after each shot in order that the trigger may reengage with the sear.

(6) To remove cartridges not fired disengage the magazine slightly and then extract the cartridge in the barrel by drawing back the slide.

(7) The pistol must be kept clean, free from rust, and properly oiled. Excessive oil left in the mechanism will cause the parts to gum and work stiffly.

(8) Care must be exercised to insure that the disconnector is properly assembled to the sear.

(9) The hammer should not be snapped when the pistol is partially disassembled.

(10) The stocks need never be removed, as the pistol can be dismounted and assembled without removing them.

(11) Use no hammer either in assembling or dismounting the pistol.

(12) Magazine: Reasonable care should be taken to see that the magazine is not dented or otherwise damaged.

Never insert the magazine and strike it smartly with the hand to force it home, as this may spring the base or the inturning lips at the top. It should be inserted by a quick continuous movement.

MISCELLANEOUS DATA CONCERNING PISTOL.

Weight, 2 pounds 7 ounces.

Trigger pull, 6 to 7½ pounds.

Total length, 8.593 inches.

Barrel:

Length, 5.025 inches.

Diameter of bore, 0.445 inch.

Rifling:**Grooves—**

Number, 6.

Width, 0.1522 inch.

Depth, 0.003 inch.

Lands, width, 0.072 inch.

Twist, one turn in 16 inches, left-handed.

Front sight above axis of bore, 0.5597 inch.

AMMUNITION—BALL CARTRIDGE.

The components of the ball cartridge consist of cartridge case, primer, powder, and bullet.

CARTRIDGE CASE.

The cartridge case is cylindrical and is made of brass. It is provided with a cannellure to prevent the bullet being forced down on the powder.

PRIMER.

The primer consists of a cup which contains the primer composition, a paper disk, and an anvil which resists the blow of the firing pin. The anvil is provided with two vents by which the flame is communicated to the charge. Ignition is produced by crushing the composition between the cup and anvil by a blow of the firing pin.

POWDER.

The powder is a smokeless powder. The charge varies with the kind and lot, but it is generally about 5 grains.

BULLET.

The body of the bullet is a cylinder. The bullet has a core of lead and tin composition inclosed in a jacket of gilding metal or cupro-nickel. It weighs 230 ± 2 grains.

	Inches.
Length of bullet.....	0.662
Diameter of cylindrical part of bullet.....	.45015
Total length of cartridge.....	1.261

To render the cartridge waterproof the inside of the neck of the case and the outside of the primer are shellacked.

Section 3. Care and Maintenance of Equipment.

[Paragraph numbers refer to Drill and Service Regulations for Field Artillery.]

GENERAL PROVISIONS.

653. The commanding officer of an organization is responsible that the equipment issued to him is kept complete and in good serviceable condition, and that his officers and men are properly instructed in the use of the tools and supplies issued for the care and preservation of public property.

654. The organization commander will require that as soon as possible after being used all articles of equipment shall be examined and, if necessary, repaired; and that the articles when left shall be in readiness for immediate use.

CARE OF THE BATTERY EQUIPMENT.**RESPONSIBILITY.**

655. The captain is responsible for the care and maintenance of the battery equipment. He will constantly supervise the work of lieutenants and other subordinates charged with responsibility for the condition of parts of this equipment.

The lieutenant assigned to Department A (32) has direct charge of and is responsible to the captain for the good order and efficiency of all parts of the wheeled matériel; the one assigned to Department B, of the horses, harness, and horse equipment; the one assigned to Department C, of the personal equipment.

The supply sergeant is responsible to the captain for the general care and maintenance of the Government property issued to the battery.

The chief mechanic is responsible to the lieutenant in charge for the good order and repair of the matériel in actual use by the battery; for this purpose he has general supervision of all battery mechanics, except those assigned to horseshoeing, and during cleaning periods, of all corporals and privates engaged in work in the matériel.

The chiefs of section are responsible to the lieutenant in charge for the good order of all matériel and equipment issued

to their sections. They are directly responsible for the serviceable condition of their teams, harness, and horse equipment.

The gunners are responsible to their chiefs of section for the good order of their pieces and caissons. They are directly responsible for the good order of the pieces.

The Nos. 4 are directly responsible to their gunners in gun sections, to their chiefs of section or the caisson corporal in charge of caissons in caisson sections, for the good order of their caissons.

The drivers are directly responsible to their chiefs of section for the good order of their horses, harness, and horse equipment.

The instrument sergeant is responsible to the captain for the good order of the range-finding, fire-control, and signal equipment.

The telephone corporal is responsible to the instrument sergeant for the good order of all the signal equipment of the battery.

Members of the special details are responsible to the telephone corporal for the good order of articles of signal equipment, to the instrument sergeant for the good order of other articles of the range-finding and fire-control equipment issued to them.

Individuals are directly responsible for the good order of all articles of personal equipment issued to them. Men assigned to sections are responsible to their chiefs of section for the good order of such articles.

It is the duty of all men to report at once to the noncommissioned officer, or officer to whom they are responsible, any injury to the matériel or any deficiency in the equipment.

INSTRUCTION.

656. Field Artillery matériel requires intelligent, systematic, and constant care.

Correct instruction and frequent practice in this subject fit the personnel to keep the matériel in serviceable condition and to effect repairs promptly and satisfactorily.

Matériel, all parts of which are clean, correctly surfaced, and in good repair, functions properly with the least possible wear and permits the making of repairs without unnecessary delays.

Detailed descriptions of the matériel in use, with full instructions for disassembling, assembling, cleaning, and caring for the same, are found in the Handbook of that matériel issued by the Ordnance Department. The noncommissioned officers of the higher grades and all officers should be thoroughly familiar with the contents of the Handbook.

657. Instruction in the care of matériel is practical. It is carried on under the direct supervision of an officer in the park during the regular cleaning periods or at other times.

The instruction of cannoneers includes the following:

1. Nomenclature of the principal parts of the piece and caisson;

2. Uses and care of tools and accessories;

3. Uses of the different materials issued for cleaning and preservation;

4. Cleaning of carriages, of leather cases and straps, and of canvas covers;

5. Principles of lubrication, and the lubricating of all parts requiring it;

6. Disassembling and assembling those parts of the matériel which periodically require cleaning and repair;

7. Making of minor repairs and adjustments;

8. Special cleaning required after firing;

9. Painting of carriages.

The instruction of drivers and individually mounted men includes the care of harness and horse equipment.

The instruction of members of the battery commander's detail includes the care of the range-finding and fire-control and signal equipment.

NOMENCLATURE.

658. The study of nomenclature may well be continued to include practically all parts of the piece and caisson if time permits.

The purpose of this instruction is not so much to memorize the exact names of the many parts as to call attention to their existence and to their relations with other parts; facts which otherwise easily escape notice. The knowledge gained stimulates interest and develops resourcefulness in making repairs.

TOOLS AND ACCESSORIES.

659. As it can not be safely assumed that, without instruction, even the simplest tools will be used correctly by men not accustomed to working with them, it is necessary that instruction and practice be given in the uses and care of all tools and accessories with which the men may be called upon to work.

The axes, hatchets, picks, and shovels carried on the carriages are intended for use with the battery when in the field or when engaged in exercises simulating field service and will not be put to other uses. The working edges and surfaces will be kept bright and lightly oiled, the edges sharp if intended for cutting or smooth if for digging, and the handles painted.

Canvas buckets are used for watering animals and for washing carriages and equipment. If possible, they should be dried before placing them in the holders. To fold the bucket: Place the bottom of the bucket on the ground and hold the bottom in position with both feet; grasp the top with both hands and turn it either to the right or left so that the sides twist and fold.

The lanterns carried on the carriages are used for illumination only when in the field. They will be kept clean, filled, and ready for use.

In the park, paulins are used to cover harness and guns; on the march as seat cushions. The paulin is square and is made up of five strips of canvas of the same size. When used as a seat cushion it will be folded as follows: Spread the paulin on the ground and throw the ropes upon it; fold each outside strip upon the strip adjacent to it and continue to fold in this manner until the paulin is the size of a single strip; double it in the same direction; then fold both ends over, one falling above the other so that the folded paulin is one third the length of a strip; place on the chest with the exposed end down.

The metal ends of picket ropes will be kept free from rust, and the hooks sufficiently open to be readily engaged in the rings.

Tool kits will be kept complete and serviceable; edges of cold chisels free from nicks; drifts and punches properly shaped and files clean.

Copper wire is used to lash nuts and other threaded parts not secured by split pins to prevent unscrewing.

Special wrenches, spanners and other tools and accessories will be used only for the purposes for which intended.

Bolos are used only when in the field. The blades will be kept bright, sharp and well oiled; the scabbards clean.

Instruction will be given in different methods of using the tackle blocks and rope, and in making the common knots and hitches.

Carriages in use will be equipped habitually with all articles of their prescribed equipment. The battery wagon and store wagon are habitually kept packed. When convenient, however, the various chests contained therein may be kept outside the wagons for convenience in getting at their contents.

MATERIALS FOR CLEANING AND PRESERVATION.

660. The proper uses of the supplies furnished for the cleaning and preservation of the battery equipment are set forth in detail in the Handbook of the matériel and in Ordnance Pamphlet No. 1965.

In general these materials are issued for the following purposes:

Oils and greases.—Lubricating oil, sperm oil, clock oil, and petroleum or vaseline, for lubrication;

Light slushing oil and cosmic as rust preventives;

Coal or kerosene oil for the cleaning of metal parts and for lanterns;

Boiled linseed oil, raw linseed oil, and turpentine as ingredients of prepared paint;

Neat's-foot oil for softening and preserving leather;

Hydrolin oil for filling recoil cylinders. This oil should be used for no other purpose.

Officers and men should be able to distinguish the different oils and greases by the color, smell, or viscosity.

Material for painting.—Second coat and third coat olive drab paint for the wheeled matériel.

Brown enamel primer for painting horse collars, trace chains, etc.

Rubberine paint for sealing blank charges.

Sal soda for removing dirt and grease before painting.

Powdered lye for removing old paint.

Sandpaper for smoothing surfaces before painting.

Japan drier as an ingredient for hastening the drying.

Boiled linseed oil as an ingredient for hastening the drying and for making the paint more suitable for interior work.

Raw linseed oil as an ingredient for making the paint more suitable for outside work.

Turpentine for thinning paint.

Sash and varnish brushes for painting.

Miscellaneous materials.—Borax as a flux in welding;

Camel's hair brushes for removing dust and lint from optical instruments;

Castile soap for cleaning leather;

Chamois skin as a wiping cloth for instruments except on the lenses;

Crocus cloth for polishing metal;

Emery cloth for cleaning metal by abrasion or wearing away of the surface;

H. and H. or Paco soap for cleaning cloth and web equipment;

Lavaline for polishing metal, such as bearing surfaces of collars, etc.;

Russet leather dressing for polishing leather after cleaning;

Saddle soap as a dressing for leather;

Soap polish as a substitute for lavaline;

Sponges: Large size for washing carriages, small size for cleaning leather;

Waste as a wiper for general cleaning;

Wax for rubbing on thread before sewing.

CLEANING OF CARRIAGES, ETC.

661. Frequent wiping or washing of all parts of the carriage is desirable not only for the purpose of keeping them clean, but also to aid in the detection of missing bolts, nuts, and split pins and of parts broken, cracked, or out of adjustment.

Buckets and sponges are habitually used for washing carriages. The use of a hose through which water is thrown forcibly against the carriage tends to wet parts which are not easily accessible for drying. When convenient, carriages may be hauled into shallow water for washing.

After washing, the carriages are dried with sponges or cloths. Leather cases and straps are cleaned in a manner similar to that prescribed for harness (678-680).

Canvas covers are cleaned with water and H. and H. or Paco soap (689). Leather parts fastened to the covers should not be immersed in the water.

LUBRICATION.

662. It is of great importance that the matériel be kept properly lubricated. By that is meant the constant maintenance of a thin film of the proper lubricant between all working and bearing surfaces and the surfaces on which they work or bear. This film of lubricant is required in order that the parts may function easily and without unnecessary wear.

The frequency with which the various mechanisms and parts should be lubricated and the amount of lubricant that should be applied in each case can not be definitely prescribed; these depend upon the conditions under which the matériel is being used. It should be borne in mind, however, that too little oil causes far more waste and damage than too much.

Oil holes are provided at various places where the surfaces to be lubricated are not directly accessible. These holes should be cleaned out frequently. Except during oiling, they should be fully closed by the means provided. Before oiling at an oil hole wipe off carefully any dirt or grit near the opening that might be carried down into it by the oil.

Before applying fresh lubricant the old should, if practicable, be wiped from the surfaces and the surfaces should be clean and free from grit. While applying lubricating oil the mechanism is operated or the part is moved to insure the formation of a complete oil film between the surfaces, and care must be taken, especially when lubricating through an oil hole in cold weather, to see that sufficient oil actually reaches the proper surfaces. When oiling, cotton waste should be at hand and any oil that spills or runs upon surfaces where it is not required should be wiped up at once in order to prevent the accumulation of dust and dirt.

The men are practiced in lubricating the various mechanisms and parts, and are thus taught the location of the oil holes and

other points where oil should be applied, and the proper methods of handling the oil and waste.

Detailed instructions with reference to the uses of the various oils are contained in the Handbook.

DISASSEMBLING AND ASSEMBLING.

663. In disassembling, if the parts can not be readily removed, the tendency of uninstructed men is immediately to use too great force. By teaching them to exercise patience and ingenuity, this tendency will be checked and the frequent breaking of parts avoided. Metal parts should never be struck directly with a hammer; a buffer of wood or soft metal should always be interposed. The disassembled parts should be kept together while being cleaned and should be reassembled as soon as possible.

In assembling, a thin coating of oil is applied to all unpainted metal parts, including especially the threads of bolts and nuts, in order to prevent the formation of rust and to aid in the next disassembling. At points where friction may be developed when the matériel is in use, a lubricating oil is used; at other points light slushing oil. All nuts are secured by split pins, which should be replaced and properly opened after the nuts are screwed home; threaded parts not secured by split pins are lashed with copper wire to prevent unscrewing.

Before assembling it is advisable to paint those parts requiring it that after assembling become more or less inaccessible. In so doing, however, care must be taken to see that no bearing surfaces are painted.

REPAIRS AND ADJUSTMENTS.

664. All cannoneers are taught to effect minor repairs such as the replacing of a worn-out brake shoe or of a damaged pole and to make simple adjustments such as the adjustment of the brakes.

The more difficult repairs are made by the mechanics and the noncommissioned officers.

CLEANING AFTER FIRING.

665. As soon as possible after firing, the bores of the guns should be cleaned with a solution of ingredients in the following proportion: One-half pound of sal soda to one gallon of boiling water. They are then dried carefully and oiled.

Also, the exploded primers should be removed from the cartridge cases and the cases washed by immersing them completely in a hot but somewhat weaker solution of sal soda; they are then dried carefully. Neither acids nor solutions of acids will be used for cleaning cartridge cases.

PAINTING.

666. Instructions with reference to the painting of the matériel are contained in the Handbook.

The object of painting the matériel is to aid in its preservation and to render it less visible when in the field.

Surfaces that become marred should be painted over without waiting for an opportunity to paint the entire carriage.

The number of coats of paint that should be applied in any period depends upon the conditions under which the matériel is being used.

THE WHEELED MATÉRIEL.

667. In order to maintain the wheeled matériel in serviceable condition and to practice the men in its care, all parts are periodically disassembled, examined, cleaned, and assembled. For this purpose a schedule of systematic cleaning will be followed.

668. The cleaning schedule should be simple in operation; should set forth briefly the routine work to be done each day that the matériel is used, and the special work to be done from time to time; and the items of work included therein should be such that together they constitute a thorough overhauling of the carriages. The operations at which the presence of a commissioned officer is required by the provisions of the Handbook are usually omitted from a schedule arranged for the use of enlisted men, such work being performed when specially ordered

669. Work on the carriages during cleaning periods is performed under the immediate supervision of the lieutenant assigned to Department A (32).

The chief mechanic is in direct charge of the work. He is responsible that the requirements of the cleaning schedule are complied with; that the parts broken, cracked, worn, or out of adjustment are detected and promptly repaired; that the necessary materials and spare parts are obtained from the quartermaster sergeant; that the tools and cleaning materials are properly used, and that the carriages are left always in readiness for immediate use.

670. On each day that the carriages are used, two periods will habitually be designated for their care; one before the carriages leave park while the drivers are harnessing, the other during the first stables held after the return of the carriages to park.

671. At the first period, the gunners and the Nos. 4, assisted by other members of the gun squad, if present, look over their pieces and caissons, oil wheels, etc., and see that the carriages are in every way prepared for use.

672. At the commencement of the period held during stables (603) the gunners, the Nos. 4, and such other cannoneers as may be needed for the work at hand, assemble at the park where the chief mechanic notifies them of any special work required for the day. They then proceed with the regular cleaning and with the special work ordered.

The chief mechanic moves from carriage to carriage inspecting the work and assisting wherever needed.

At the close of the period he accompanies the lieutenant in a careful inspection of the carriages, and when so directed, sees that the park is put in order and that the men are dismissed.

At this work an absent gunner is replaced by the caisson corporal of the same section. In caisson sections, one caisson corporal is placed in charge of the caissons of his section for cleaning. Other caisson corporals, not required elsewhere, are present and assist at the cleaning of the carriages of their sections.

673. If it is impracticable to care for the carriages during stables, other periods will be designated at which times the cleaning will be carried on in a manner similar to that described above.

HARNESS AND HORSE EQUIPMENTS.

674. Constant care is required to keep the harness and horse equipment clean, serviceable, and in good repair, the leather parts soft and pliable, the metal parts free from rust and dirt and properly painted.

Drivers and individually mounted men will be carefully instructed in the care of harness and horse equipment.

675. Harness and horse equipment will habitually be cleaned immediately after use. This obligation, like the care of the horse, is to be regarded as a part of the mounted duty, and exercises will not be considered as completed until horses, harness, and equipment have been cared for and put in order.

The cleaning is performed under the immediate supervision of the lieutenant assigned to Department B (32).

The chiefs of section are in direct charge of the work pertaining to their sections and are responsible that the cleaning is carried out as ordered, that the materials issued are properly expended, and that the harness is left in good order.

Ordinarily about 30 minutes should be allowed for a driver to unharness his pair and properly care for and dispose of his harness.

To do this the driver wipes and cleans with a damp cloth the bits, the bearing surfaces of the collars, and the leather parts of the harness, paying particular attention to the places where the leather is wet from perspiration; dries the bits and rubs them with a cloth damp with oil, and puts the harness in order. If the saddle blanket is wet, he leaves it uncovered to dry. At this time, also, parts that should be repaired or replaced are given to the chief of section, who is responsible that they are promptly taken to and returned from the saddler or that the necessary new parts are procured from the quartermaster sergeant.

676. Care should be exercised in handling all articles of harness and horse equipment. Saddles must not be dropped or thrown about, as fractured arches or broken side bars may result; collars must not be subjected to rough treatment, or they may be bent out of shape and rendered unfit for use.

Such parts as stirrup straps, quarter straps, etc., should occasionally be exchanged or be altered in length so as to bring fresh holes at the buckles or fresh surfaces into wear.

677. The saddle blanket should be kept clean, soft, and free from wrinkles. Occasionally it should be hung in the sun and wind, and then beaten and brushed. When necessary it is thoroughly cleaned by repeated immersions in tepid soap suds and then, without wringing or pressing, is hung over a pole or line to dry.

678. At intervals of from one to four weeks, depending upon climatic conditions and the use to which it has been subjected, the harness should be completely taken apart and thoroughly overhauled, cleaned, and dressed.

When necessary the collars, trace chains, etc., should be painted.

To clean and dress the harness: Take the harness completely apart, unbuckling straps, removing buckles, loops, etc., wherever possible.

With a sponge dampened but not wet with water wipe off all surface dust and mud. Rinse out the sponge, moisten it in clear water, squeeze it until nearly dry, rub it vigorously upon castile soap, and work it about in the hand until a thick, creamy lather is formed. Clean each leather piece thoroughly in this lather, each strap being drawn its entire length through the lathered sponge so as actually to remove therefrom the salt, sweat, and dirt.

Again rinse out the sponge and make a thick lather as described above except that saddle soap is used. Go over each piece as before, working the lather well into every part. Place the parts in the shade to dry.

While these parts are drying, clean the buckles and other metal parts of the harness.

After the leather parts have become partially dry, they are rubbed vigorously with a soft cloth.

The harness is then assembled.

679. As long as the saddle soap dressing maintains the leather soft and pliable nothing further is required, but from time to time it will be necessary to apply a little neat's-foot oil. Frequent light applications are of more value than infrequent heavy ones.

To oil the harness: Clean the leather parts in the lather of castile soap as described above.

While the parts are still damp apply the oil to the flesh side of the leather with a cloth or cotton waste moistened but not soaked with oil, using long, light strokes. A light even distribution of the oil should be sought. The tendency is to use too much oil; the amount necessary for each set of harness should rarely exceed two ounces. After oiling, the parts should, if practicable, be allowed to stand for 24 hours in a warm, dry, shady place, and should then be rubbed with a dry cloth. The harness is then assembled.

680. Detailed instructions for cleaning, dressing, and oiling leather equipment are contained in Ordnance Pamphlet No. 1965.

RANGE-FINDING AND FIRE-CONTROL AND SIGNAL EQUIPMENT.

681. The instructions contained in the Handbook, in Ordnance Pamphlet No. 1796, and in Signal Corps Manual No. 3, for the care and disassembling of the range-finding and fire-control and signal equipment will be followed.

682. The equipment will be cared for as soon as possible after being used, the work on each instrument being performed habitually by the individual assigned to its service.

In caring for the instruments chamols skin is ordinarily used as a wiper on parts other than optical surfaces. To clean such surfaces, remove with a camel's hair brush all particles that might scratch the surface, moisten the surface with the breath, wipe it carefully with the special lens paper that can be procured from the Ordnance Department or with a piece of old soft linen, and remove any remaining lint with the brush.

Water is harmful to optical surfaces except in very small quantities, as from the condensation of the breath. The perspiration of the body contains an acid that decomposes optical glass, and for that reason drops of perspiration and finger marks should not be permitted to remain thereon. Under no circumstances will dirty cloth, chamols skin, cotton waste, or similar materials be used for cleaning optical surfaces, and oil will never be allowed to reach them.

It is important that optical parts of instruments be kept in warm, dry places when not in use.

683. Both before starting out for drill or exercise and after returning from the same, all service buzzers will be tested to insure their being in working order.

During the tests described below the switch lever of the service buzzer, Model 1914, should remain on the side marked T.

TELEPHONE TESTS.

(a) See that the plug is firmly seated in the jack, that the line connections are good, and that ground connection is good (in moist earth).

(b) Attach wire connector to ground rod, blow into transmitter, and at the same time, by pressing and releasing the switch in the transmitter, the blowing should be clearly heard in the receiver. If it is, this establishes the fact that the telephone and plugs are in good order.

(c) Connect the line binding post, and then make the test as in No. 2. If this test works, the telephone is in order.

(d) Examine buzzer key contact; see that the upper contact is made when key is up, and that it is broken when key is down. See that both lower contacts are made when key is down and both are broken when key is up.

(e) Test the battery and receiver by connecting the terminals R and T with the telephone tool. If a distinct click is heard, battery and receiver are in order.

(f) Test the transmitter by connecting the line-binding posts as in test No. 3; then short circuit the transmitter terminals with the telephone tool. If this makes the primary circuit a loud click will be heard in the receiver, and the trouble is located in the transmitter or its cords. The rear cover over the switch and connections can be removed in the event of a fault being localized there. The transmitter proper must never be opened under any circumstances, as this will invariably result in its complete destruction.

(g) To test the secondary circuit: With the plug inserted in the telephone touch the ground rod to one pole of a good battery and the line connector to the other. If a distinct click is heard in the receiver, the secondary circuit is in order.

(h) To test the line: Operate the switch button on the transmitter, and if a click is heard in the receiver the line is probably grounded, as a click indicates a complete circuit. If no click is heard the circuit is open, which may be caused by very poor connections or a severed line.

If ground connections are good, the signal corporal should immediately hasten over the line, repairing any damage to insulation, or splicing any breaks in the line that can be located.

(i) Faults in the line are most surely discovered by cutting in at several places with an extra instrument. This can be done with a receiver only. They are due to grounds or breaks.

A bad ground of the line near the instrument is indicated by a weakening of the buzzer note when the instrument is connected to the line, and frequently by a noisy receiver. A partial ground of the line is indicated by weakness or complete failure of telephone transmission, although buzzer transmission may still be possible. An opening or break in the line is indicated by complete failure of transmission by telephone, although buzzer transmission may still be possible.

Elimination schedule.

Test No. 2 (phone and plugs).....	{ Fails; make test No. 3. Works; phone is O. K.
Test No. 3 (phone).....	{ Fails; make test No. 4. Works; plug or cords out of order; replace or repair.
Test No. 4 (buzzer contact).....	{ Buzzer contact O. K.; make test No. 5. Buzzer contact not O. K.; adjust buzzer contact; make test No. 2; if this fails, make test No. 3.
Test No. 5 (battery and receiver)...	{ Fails: (1) Repair or replace receiver or receiver ends; (2) clean and brighten carbon terminals and zinc bottom on battery; (3) replace battery; make test No. 2; if this fails, make test No. 3. Works; make test No. 6.
Test No. 6 (transmitter).....	{ Works: repair or replace transmitter; make test No. 2; if this fails, make test No. 3. Fails: make test No. 7.
Test No. 7 (secondary circuit).....	{ Works; primary coil or winding out of order. Fails; secondary coil or winding out of order.

685. Flash lights are issued for use during night firing. Those with hoods are for issue to the instrument sergeant and to the gunners; those without hoods to the battery commander,

the reconnaissance officer, the executive and his officer assistant, and in each gun section to the chief of section, No. 1 and No. 3.

686. Field glasses and such other articles of this equipment as the captain may desire will be issued to individuals before each drill or exercise involving their use. Immediately thereafter they will be turned in and stored in such place as the captain may direct.

INDIVIDUAL EQUIPMENT.

687. The articles of individual equipment will be kept in serviceable condition either by allowing the men to care for them at their own time or by designating special periods for this work.

In either case the work is under the supervision of the lieutenant in charge (32), and the chiefs of section are responsible that it is properly carried on and that the necessary cleaning materials are on hand, available for use and properly expended.

688. All men will be instructed in the care and repair of this equipment, in accordance with the instructions contained in Ordnance Pamphlet No. 1965.

689. Articles of cloth equipment should be frequently well brushed with a stiff bristle or a dry scrub brush.

They should be washed only when necessary and then with a solution made by using ingredients in the following proportions: One cake of H. and H. or Paco soap dissolved in nine cups of hot water.

To wash an article of cloth equipment: Remove all dust and mud by brushing; spread the article on a clean board or rock; apply the soap solution with a scrub brush; when a good lather appears wash it off with clean water and place the article in the shade to dry.

690. Leather equipment is cleaned in a manner similar to that prescribed for harness (678-680).

691. Canteens and components of the mess outfit should be kept clean, and water and food kept in them no longer than necessary. Articles made of aluminum should be cleaned with water and a neutral or slightly alkaline soap, such as H. and H. In cleaning canteens a little sand may be used to advantage.

692. A pistol-cleaning kit is issued to each battery, and the men will be instructed in its use.

The pistol will be kept clean, free from rust, and properly oiled. It should be well oiled at all times in order to lubricate the working parts and to prevent the formation of rust; but excessive oil left in the mechanism causes the parts to gum and work stiffly. The pistol will be cleaned always immediately after firing.

A detailed description of the pistol and instructions for its disassembling, assembling, and care are found in Ordnance Pamphlet No. 1886.

693. The individual equipments will be frequently examined and parts needing repair will be repaired either by the responsible individual or by a mechanic.

694. It is important that both officers and enlisted men have a general knowledge of the repair of equipment. In active service when the replacing of equipment may be difficult and uncertain, the repair thereof may be of great importance. In time of peace opportune repairs prolong the life of the equipment and reduce the cost of maintenance of the organization.

CARE OF BATTALION AND REGIMENTAL HEADQUARTERS EQUIPMENTS.

695. The several parts of the battalion and regimental headquarters equipments are cared for as prescribed for the corresponding parts of the battery equipment with necessary modifications; the adjutant, sergeant major, and signal corporal being charged with responsibilities corresponding to those of the captain, instrument sergeant, and telephone corporal, respectively.

The signal corporal is responsible to the sergeant major for the good order of the reel cart, its team, harness, and horse equipment.

696. Compasses, field glasses, watches, and such other articles of the range-finding and fire-control, signal, and engineer equipment as the adjutant may desire will be issued to individuals before each drill or exercise involving their use. Immediately thereafter they will be turned in and stored in such place as the adjutant may direct.

Section 4. Uniforms.

Uniforms and clothing issued to enlisted men must not be sold, pawned, loaned, given away, lost or damaged through

neglect or carelessness. Any soldier who violates this rule may be tried by a military court and punished.

All uniforms and articles of clothing issued to enlisted men, whether or not charged on their clothing allowance, remain the property of the United States and do not become the property of the soldier either before or after discharge from the service. Under the law a soldier honorably discharged from the Army of the United States is authorized to wear his uniform from the place of his discharge to his home within three months after the date of such discharge. To wear the uniform after three months from the date of such discharge renders such person liable to fine or imprisonment, or both.

The dress uniform (the blue uniform) consists of the dress cap, dress coat, dress trousers, and russet-leather shoes. The straight, standing, military, white linen collar, showing no opening in front, is always worn with this uniform, with not to exceed one-half inch showing above the collar of the coat. Turned-down, piccadilly, or roll collars are not authorized.

When under arms, white gloves and the garrison belt (or russet-leather belt and cartridge box) are worn.

The full-dress uniform is the same as the dress uniform, with the breast cord added.

The service uniform is either cotton (summer) or woolen (winter) olive drab.

For duty in the field it consists of the service hat, with cord sewed on, service coat or sweater, service breeches, olive-drab flannel shirt, leggings, russet-leather shoes, and identification tag. In cold weather olive-drab woolen gloves are worn; at other times, no gloves.

When not in the field, the service cap is worn instead of the campaign hat. Under arms, white gloves and the garrison belt (or russet-leather belt and cartridge box) are worn.

Wear the exact uniform prescribed by your commanding officer, whether you are on duty or off duty.

Never wear a mixed uniform, as, for instance, a part of the service uniform with the blue uniform.

Never wear any part of the uniform with civilian clothes. It is very unsoldierly, for example, to wear a civilian overcoat

over the uniform or to wear the uniform overcoat over a civilian suit.

Keep the uniform clean and neat and in good repair.

Grease spots and dust and dirt should be removed as soon as possible.

Rips and tears should be promptly mended.

Missing buttons and cap and collar ornaments should be promptly replaced.

There is but one correct and soldierly way to wear the cap. Never wear it on the back or side of the head.

The service hat should be worn in the regulation shape, peaked, with four indentations, and with hat cord sewed on. Do not cover it with pen or pencil marks.

Never appear outside your room or tent with your coat or olive-drab shirt unbuttoned or collar of coat unhooked. Chevrons, service stripes, and campaign medals and badges are a part of the uniform and must be worn as prescribed.

When coats are not worn with the service uniform olive-drab shirts are prescribed.

Suspenders must never be worn exposed to view.

Never appear in breeches without leggings.

Leather leggings should be kept polished. Canvas leggings should be scrubbed when dirty.

Russet-leather (tan) shoes should be kept clean and polished.

The overcoat when worn must be buttoned throughout and the collar hooked. When the belt is worn it will be worn outside the overcoat.

Section 5. The Service Kit.

The service kit is composed of two parts—(a) the field kit, which includes everything the soldier wears or carries with him in the field, and (b) the surplus kit.

The field kit consists of the arms, personal and horse equipments and clothing, additional to that worn on the person, required by and prescribed for the soldier in the field.

The articles comprising the kit vary with the duties of the men and are furnished by the Ordnance Department, the Quartermaster Corps, and the Medical Department.

The field kit for individually mounted men consists of and is carried as shown below.

ORDNANCE PROPERTY.

(A) PERSONAL EQUIPMENT.

Articles.	Where carried.
1 can, bacon.....	Near saddle pocket.
1 canteen.....	{ On left side, on pistol belt between first-aid pouch and magazine pocket.
1 canteen cover.....	On canteen.
1 cup.....	On canteen, under cover.
1 fork.....	Near saddle pocket.
1 knife.....	Near saddle pocket.
1 spoon.....	Near saddle pocket.
1 meat can.....	Near saddle pocket.
1 pistol, belt, holster, magazine pockets, 2 extra magazines, 21 cartridges.....	{ On person, belt outside all clothing, pistol on right hip, first-aid packet on left of and toward front of belt, magazine pocket in front of first-aid packet.
1 pouch for first-aid packet.....	
1 spurs, pair.....	On person, buckles outside.
1 spur straps, pair.....	

(B) HORSE EQUIPMENT.

1 bridle.....	On horse.
1 halter headstall.....	On horse.
1 halter tie rope.....	On halter, free and secured in near pom- mel ring.
1 link.....	On bridle, free end snapped up.
1 saddle blanket.....	On horse.
1 saddle.....	On horse.
1 saddlebags, pair.....	On saddle, the saddlebag straps passed through the cincha rings and drawn tight before fastening.
1 surcingle.....	Over saddle, buckled on near side.
1 currycomb.....	{ Grooming kit.....
1 horse brush.....	
1 feed bag.....	On saddle.
1 grain bag.....	In feed bag.

QUARTERMASTER PROPERTY.

(C) EQUIPMENT.

1 identification tag.....	Slung around neck by tape.
5 pins, tent, shelter.....	{ In blanket roll.
1 pole, tent, shelter.....	
1 tent, shelter, half, mounted.....	Around and forming part of blanket roll.

(D) CLOTHING COMPONENT.

1 blanket.....	In blanket roll.
1 slicker.....	Rolled and strapped to pommel of saddle.
1 towel.....	Off saddle pocket, outside canvas lining.
1 comb.....	
1 soap, cake.....	Wrapped in towel.
1 toothbrush.....	
1 drawers, pair.....	
2 stockings, pairs.....	In blanket roll.
1 undershirt.....	

(E) RATIONS.

2 reserve rations, each consisting of—

12 ounces bacon.....	In bacon can.
16 ounces hard bread.....	Divided between saddle pockets.
1.12 ounces coffee, R. & G.....	In coffee bag of saddlebags, in near pocket.
2.4 ounces sugar.....	In sugar bag of saddlebags, in near pocket.
0.16 ounce salt.....	In salt bag of saddlebags, in near pocket.

(F) FORAGE.

1 feed, 4 pounds of grain.....In grain bag.

(G) MEDICAL PROPERTY.

1 first-aid packet.....In pouch on belt.

The coat and the overcoat form part of the equipment to be carried with the men in the field only when climatic conditions require them. When they are not ordered carried they are made up in bundles, secured and marked so that they may be forwarded whenever necessary.

When the coat is carried and is not worn on the person it is placed in the blanket roll. When the overcoat is carried and is not worn it is rolled and strapped on the pommel of the saddle.

To roll the overcoat or slicker.—Spread the overcoat on the ground, inside down, skirt buttoned throughout, sleeves parallel to the middle seam, collar turned over on the shoulders.

Turn the tails of the coat under about 9 inches, the folded edge perpendicular to the back seam. Fold over the sides to form a rectangle not more than 34 inches across, according to the size of the coat. Roll tightly from the collar with the hands and knees, and bring over the whole roll that part of the skirt which was turned under, thus binding the roll.

The slicker is rolled in a similar manner.

To make the blanket roll for mounted men.—Spread the shelter half (model 1904) on the ground, roll straps underneath,

and fold over the triangular part on the rectangular part. Turn under the roll strap edge of the shelter half so that the width of the fold will be 8 inches. Fold the blanket once across the longer edges and lay the blanket on the shelter half, folded edge within 1 inch of the roll strap edge of the shelter half. Fold the sides of the blanket and of the shelter half inward, width of folds about 11 inches. The shelter tent pole and pins are now laid on the blanket at the edge farthest from the roll strap edge, pole on one side of the center line, pins on the other, so as to allow the roll when completed to bend at the center. Place the underclothing on the blanket. If the sweater is to go in the roll, spread it smoothly over the blanket.

Roll tightly toward the roll strap edge, using hands and knees, and bring over the entire roll the part of the shelter half which was turned under, thus binding the roll. Buckle the two available roll straps about the roll, passing them around twice. The roll thus formed should be about 44 inches long.

To pack the feed bag for individually mounted men.—The grain is placed in the grain sack and equally divided between the two halves. The elongated grain sack is then placed inside the feed bag and the whole lashed tightly to the blanket roll by the web straps at each end of the feed bag, so that the open part of the feed bag is closed against the blanket roll. If empty, the feed bag, with grain sack inclosed and all web straps buried in the bag, is lashed to the blanket roll by the coat straps.

To pack the blanket roll with the attached feed bag, three coat straps are used, one to fasten the middle of the roll to the middle of the cantle of the saddle, and one at each end to fasten the end of the roll to the saddlebag strap ring. The blanket roll is placed on the cantle so that the feed bag will be uppermost. The coat straps are passed twice around the roll and buckled.

The equipment of each driver is the same as for individually mounted men with the exception of horse equipment and grain.

The driver's horse equipment consists of 1 horse brush, 1 currycomb, 2 feed bags, 2 grain bags, and 2 surcingles. Each driver carries a feed of grain for each horse. Halters, saddlebags, saddle blankets, etc., are included in the harness.

The driver's canteen is snapped in the near pommel ring of the off saddle. His saddlebags, blanket roll, feed bags, slicker,

etc., are likewise packed on the off saddle. After attaching his slicker the driver turns the top of the roll over the pommel down into the saddle so as to avoid any interference with the rein roller on the off saddle.

To pack the driver's blanket roll and feed bags.—The grain is placed in the grain sacks and each sack placed in its feed bag. The two feed bags are tied securely together at their open ends, using the "nose and head" web straps, the two bags being tied as closely as possible to prevent the lower ends chafing against the traces. The two feed bags are then suspended across the seat of the saddle of the off horse and lashed in place by the 60-inch coat straps on each side, as follows:

Pass the coat strap under the rear quarter strap and take one turn around the nose bag, if necessary punching a "throat" into the bag near the lower end to prevent the coat strap slipping. The blanket roll being lashed to the center of the cantle, bring the free end of the roll forward so as to bind over the feed bag and take two turns around the end of the blanket roll with the coat strap. Then pass the free end of this strap over the straps thus in place and buckle tightly. Do the same on the other side.

If more than one feed is to be carried, place the grain for the first feed in the closed end of the feed bag and lash the feed bag tightly with the rawhide thong. Put the remainder of the grain in the grain sack, and place the grain sack in the feed bag; secure the two feed bags to the off saddle as above.

The surcingle is carried one on each horse, buckled over the saddle.

With the exceptions noted, all articles of the driver's equipment are packed and carried in a manner similar to that described for individually mounted men.

In addition to the kits above prescribed, each corporal is provided with a housewife which he will carry in his haversack or off saddle pocket.

The members of the special details and of the headquarters company are provided with various equipment which they carry on their persons. The field glasses will be carried on the right side, the flag kit on the back, the strap in each case passing over the left shoulder.

MANUAL FOR FIELD ARTILLERY.

An agent while on duty as such will wear on the right forearm a red brassard. Brassards are furnished by the Quartermaster Corps.

The field kit for cannoneers and all men not mounted consists of and is carried as shown below:

ORDNANCE PROPERTY.

(A) PERSONAL EQUIPMENT.

Articles.	Where carried.
1 can, bacon	In haversack.
1 can, condiment	
1 canteen	On right rear of pistol belt.
1 canteen cover	On canteen.
1 cup	On canteen under cover.
1 fork	In haversack.
1 knife	In haversack.
1 spoon	In haversack.
1 meat can	In haversack.
	On person, belt outside all clothing on right hip,
1 pistol, belt, holster, magazine pocket, 2 extra magazines, 21 cartridges.	first-aid packet on left of
1 pouch for first aid packet.	and toward front of belt,
	magazine pocket in front of first-aid packet.
1 haversack	On person.

QUARTERMASTER PROPERTY.

(C) EQUIPMENT.

1 identification tag	Slung around neck by tape.
5 pins, tent, shelter	In blanket roll.
1 pole, tent, shelter	
1 tent, shelter half, mounted	Around and forming part of the blanket roll.
1 blanket	In blanket roll.
1 slicker	Folded and placed between folds of one of paulins of carriage on which soldier rides.
1 towel	In haversack.
1 comb	Wrapped in towel.
1 soap, cake	
1 toothbrush	In blanket roll.
1 drawers, pair	
2 stockings, pairs	
1 undershirt	

(E) RATIONS.

2 reservé rations, each consisting of—

12 ounces bacon	In bacon can.
16 ounces hard bread	In haversack.
1.12 ounces coffee, R. & G. }	In condiment can.
2.4 ounces sugar	
0.16 ounce salt	

(G) MEDICAL PROPERTY.

1 first-aid packet.....In pouch on belt.

The remarks made with reference to the coat and the overcoat in the case of mounted men apply to cannoneers except that when the overcoat is carried, and not worn by the cannoneer, it is folded and placed between the folds of a paulin on a carriage of the section to which the cannoneer is assigned.

When the old model haversack and canteen are issued the personal equipment of men not mounted is increased by two canteen haversack straps. Such haversacks are slung from the right shoulder to the left side. The canteen is slung from the left shoulder to the right side, the strap passing over that of the haversack. Both ends of the haversack strap and the rear end of the canteen strap pass under the pistol belt.

When the old model canteen and cup are issued the cup is carried in the near saddle pocket by mounted men and in the haversack by men not mounted.

To make the blanket roll for men not mounted.—Lay the shelter half on the ground and fold over the triangular part.

Hold the blanket up by two corners, the shorter edges vertical; bring the two corners together, thus folding the blanket in the middle; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulder, the blanket extending between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger; slip the second finger of the right hand between the folds, seize the double folded corner; turn the left

(disengaged) corner in, and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds. The blanket is now folded in six thicknesses.

Lay the folded blanket on the shelter half so that one of its shorter sides will be about 8 inches from the edge of the shelter half farthest from the triangular part. Place the underclothing on the blanket. If the sweater is to go in the roll fold it and place it on the blanket with the folded edge of the sweater even with that of the folded edge of the blanket. Across the other short side of the blanket place the shelter tent pole and pins.

Fold over the sides and ends of the shelter half which lie outside of the blanket, causing the ropes and straps to be included within the folds.

Commencing at the end where the pole and pins are placed roll the pack, using the hands and knees to insure the roll being made as tight as possible. Just before the roll is completed open out slightly with the hands the pocket formed by the 8-inch fold of the shelter half, and then draw the pocket over the roll, thus binding it. Care should be taken to draw the canvas over the ends of the roll so as to prevent rain and dust from entering the inner portion of the roll. The roll thus formed should be about 22 inches long.

The roll is secured to the limber chest of the carriage to which the soldier is assigned, by means of the straps provided for the purpose. The rolls carried on any one limber chest are evenly disposed on either side of the door lock.

It is frequently desirable, especially in a strong wind, for the men to work in pairs in making their rolls.

Section 6. The Surplus Kit.

The surplus kit contains articles of clothing necessary in camps of several weeks' duration and to permit the replacement of clothing worn out in active operations. For these purposes the surplus kits are forwarded to troops when serving in instruction, maneuver, mobilization, and concentration camps.

or when in active service temporary suspensions of operation, or other conditions, permit the troops to rest. In certain cases in time of peace the surplus kits may, when transportation is available, accompany the troops on the march.

The surplus kit of each man consists of—

1 breeches, pair.	2 stockings, pairs.
1 drawers, pair.	1 shoe laces, extra pair.
1 shirt, olive-drab.	1 undershirt.
1 shoes, russet leather, pair.	

The kit of each man will be packed as follows:

Stockings, rolled tightly, one pair in the toe of each shoe; shoes placed together, heels at opposite ends, soles outward, wrapped tightly in underwear, and bundle securely tied around the middle by the extra pair of shoe laces, each bundle tagged with the battery number of the owner.

The breeches and olive-drab shirt are not rolled.

Surplus kit bags at the rate of one to each eight men or major fraction thereof are issued to organizations by the Quartermaster Corps.

All bags will be uniformly marked in the center of the front cover flap. Those pertaining to a battery are marked with the battery stencil and with the designation of the squad to which the bag pertains; for example, the bag belonging to the drivers of the first section will be marked below the stencil, **FIRST SEC.**, and below that, **DRIVERS.**

Bags pertaining to the headquarters company and to the supply company are marked with the headquarters company and the supply company stencil and the serial number of the bag.

The shoes, underwear, etc., of each squad are packed in the surplus kit bag in two layers of four kits each; the breeches and olive-drab shirts are neatly folded and packed on the top and sides of the layers.

MANUAL FOR FIELD ARTILLERY.**Section 7. Assembling Infantry Equipment.¹****TO ASSEMBLE THE FULL EQUIPMENT.****WITH RATIONS.**

Place the assembled equipment on the ground, suspender side of haversack down, pockets of cartridge belt up, haversack spread out, inside flap and pack carrier extended their full length to the rear.

Place three cartons of hard bread in the center of the haversack body, the lower one on the line of attachment of the inside flap; lay the remaining carton of hard bread, the condiment can and the bacon can on the top of these, the condiment can and the bacon can at the bottom, top of the bacon can to the front; the socks and toilet articles are rolled, towel on the outside, into a bundle of the same approximate dimensions as a carton of hard bread, and are placed in front of the two rows thus formed.

The inside flap of the haversack is folded over these articles, the end of the flap being turned in so that the flap, thus shortened, extends about 2 inches beyond the top of the upper row; the sides of the haversack are folded over the sides of the rows; the upper binding straps are passed through the loops on the outside of the inside flap, each strap through the loop opposite the point of its attachment to the haversack body, and fastened by means of the buckle on the opposite side, the strap being passed through the opening in the buckle next to its attachment, over the center bar, and back through the opening of the buckle away from its attachment; the strap is pulled tight to make the fastening secure; the outer flap of the haversack is folded over and fastened by means of the lower haversack

¹ Since these instructions were written 1 drawers and 1 undershirt have been added to the field kit. Place them in pack when carried otherwise in haversack. When dismounted enlisted men of Field Artillery are equipped with the model 1910 haversack, the equipment will be assembled as described above for infantry, with necessary modifications.

binding strap and the buckle on the inside of the outer flap; the strap is pulled tight, drawing the outer flap snugly over the filled haversack.

The haversack is now packed and the carrier is ready for the reception of the pack.

If one reserve ration and one emergency ration are carried in lieu of two reserve rations, the haversack is packed in the manner described above, except that two cartons of hard bread and the bacon can form the bottom layer, the bacon can on the bottom; the condiment can, the emergency ration, and the toilet articles form the top layer.

If one emergency ration is carried in addition to the two reserve rations, it is packed on top of the top layer.

To make the pack: Spread the shelter half on the ground and fold in the triangular ends, forming an approximate square from the half, the guy on the inside; fold the poncho once across its shortest dimension, then twice across its longest dimension, and lay it in the center of the shelter half; fold the blanket as described for the poncho and place it on the latter; place the shelter tent pins in the folds of the blanket, in the center and across the shortest dimension; fold the edges of the shelter half snugly over the blanket and poncho and, beginning on either of the short sides, roll tightly and compactly. This forms the pack.

To assemble the pack: Place the pack in the pack carrier and grasp the lower suspension rings, one in each hand; place the right knee against the bottom of the roll; pull the carrier down and force the pack up close against the bottom of the packed haversack; without removing the knee, pass the lower carrier binding strap over the pack and secure it by means of the opposite buckle; in a similar manner secure the lower haversack binding strap and then the upper carrier binding strap.

Engage the snap hook on the pack suspenders in the lower suspension rings.

The equipment is now assembled and packed as prescribed for the full equipment.

MANUAL FOR FIELD ARTILLERY.

TO ASSEMBLE THE FULL EQUIPMENT.

WITHOUT RATIONS.

Place the assembled equipment on the ground as heretofore described; fold up the inside flap of the haversack so that its end will be on a line with the top of the haversack body; fold up the lower haversack strap in the same manner.

To make up the pack: Fold the poncho, blanket, and shelter half, and make up the pack as heretofore prescribed, except that the condiment and bacon can (the former inside the latter) and the toilet articles and socks are rolled in the pack. In this case the pack is rolled, beginning on either of the long sides instead of the short sides, as heretofore described.

To assemble the pack: Place the pack on the haversack and pack carrier, its upper end on a line with the upper edge of the haversack body; bind it to the haversack and carrier by means of the haversack and pack binding straps; fold down the outer flap on the haversack and secure it by means of the free end of the middle haversack binding strap and the buckle provided on the underside of the flap; engage the snap hoops of the pack suspenders in the lower suspension rings.

The equipment is now packed and assembled.

To adjust the equipment to the soldier: Put on the equipment slipping the arms one at a time through the pack suspenders as through the sleeves of a coat; by means of the adjusting buckles on the belt suspenders raise or lower the belt until it rests well down over the hip bones on the sides and below the pit of the abdomen in front; raise or lower it in rear until the adjusting strap lies smoothly across the small of the back; by means of the adjusting buckles on the pack suspenders, raise or lower the load on the back until the top of the haversack is on a level with the top of the shoulders, the pack suspenders, from their point of attachment to the haversack to the line of tangency with the shoulder, being horizontal. *The latter is absolutely essential to the proper adjustment of the load.*

The position of the belt is the same whether filled or empty.

TO ASSEMBLE THE FULL EQUIPMENT LESS THE PACK.**WITH RATIONS.**

Detach the carrier from the haversack; place the rest of the equipment on the ground as heretofore described; place the four cartons of hard bread, the bacon can, the condiment can, and the toilet articles in one row in the middle of the haversack body, the toilet articles at the top, the bacon can at the bottom, top to the front, the row extending from top to bottom of the haversack; fold the inside flap over the row thus formed; fold the sides of the haversack up and over; pass the three haversack binding straps through the loops on the inside flap and secure by means of the buckles on the opposite side of the haversack; pass the lower haversack binding strap through the small buttonhole in the lower edge of the haversack, fold the outer flap of the haversack over the whole, and secure by means of the buckle on its underside and the lower haversack binding strap.

Pass the haversack suspension rings through the contiguous buttonholes in the lower edge of the haversack and engage the snap hooks on the ends of the pack suspenders.

If one reserve ration and one emergency ration are carried in lieu of two reserve rations, the haversack is packed in the manner described above, except that one emergency ration is substituted for two of the cartons of hard bread.

If one emergency ration is carried in addition to the two reserve rations, it is packed on top of the layer.

TO ASSEMBLE THE FULL EQUIPMENT LESS THE PACK.**WITHOUT RATIONS.**

Detach the carrier from the haversack; place the rest of the equipment on the ground, as heretofore described; fold up the inside flap of the haversack until its upper end is on a line with the top of the haversack body; fold the sides of the haversack over, pass the three haversack binding straps through the loops on the inside flap and secure by means of the buckles on the

opposite side of the haversack; pass the lower haversack binding strap through the small buttonhole in the lower edge of the haversack; place the condiment and bacon can (the former inside the latter) and the toilet articles and socks in the bottom of the pouch thus formed; fold the outer flap of the haversack over the whole and secure by means of the buckle on its underside and the lower haversack binding strap.

Pass the haversack suspension rings through the contiguous buttonholes in the lower edge of the haversack and engage the snap hooks on the ends of the pack suspenders.

To adjust the equipment to the soldier: Put on the equipment as prescribed for the full equipment. Adjust the cartridge belt as prescribed for the full equipment. Adjust the pack suspenders so that the top of the haversack is on a level with the top of the shoulders.

TO DISCARD THE PACK WITHOUT REMOVING THE EQUIPMENT FROM THE BODY.

Unsnap the pack suspenders from the suspension rings and snap them into the eyelets on top of the belt and in rear of the rear pockets of the right and left pocket sections; support the bottom of the pack with the left hand and with the right hand grasp the coupling strap at its middle and withdraw first one end, then the other; press down gently on the pack with both hands and remove it. When the pack has been removed, lace the coupling strap into the buttonholes along the upper edge of the carrier. Adjust the pack suspenders.

CHAPTER III.

RATIONS AND FORAGE.

Section 1. The Ration.

A ration is the allowance of food for one man for one day.

In the field there are three kinds of rations issued, as follows:

The *garrison ration* is intended to be issued in kind whenever possible. The approximate net weight of this ration is 45 pounds.

The *reserve ration* is the simplest efficient ration, and constitutes the reserve carried for field service. It consists of—

	Ounces.
Bacon.....	12
Hard bread.....	16
Coffee, roasted and ground.....	1. 12
Sugar.....	2. 4
Salt.....	. 16

Approximate net weight ----pounds.. 2

The *field ration* is the ration prescribed in orders by the commander of the field forces. It consists of the reserve ration, in whole or in part, supplemented by articles requisitioned or purchased locally or shipped from the rear.

In campaign a command carries as a part of its normal equipment the following rations:

(a) On each man: At least two days' reserve rations.

(b) In the ration section of the field train, for each man: Two days' field and one day's reserve rations.

(c) In the supply train: Two days' field rations.

In addition to the foregoing, commanders will require each man on the march to carry the unconsumed portion of the day's ration issued the night before for the noonday meal. Reserve rations are consumed only in case of extreme necessity, when other supplies are not available. They are not to be consumed or renewed without an express order from the officer in command of the troops who is responsible for the provision of supplies, namely, the division commander or other independent detachment commander. Every officer within the limits of his command is held responsible for the enforcement of this regulation. Reserve rations consumed must be replaced at the first opportunity.

Section 2. Individual Cooking.

Sometimes rations for several days are issued to the soldier at one time, and in such cases you should be very careful to use the rations that they will last you the entire period. If you stuff yourself one day, or waste your rations, you will have to starve later on.

Generally the cooking for the company will be done by the company cook, but sometimes every soldier will have to prepare his own meals, using only his field mess kit for the purpose.

The best fire for individual cooking is a small, clear one, or, better yet, a few brisk coals. To make such a fire, first gather a number of sticks about 1 inch in diameter. These should be dry. Dead limbs adhering to a tree are dryer than those picked up from the ground. Split some of these and shave them up into kindling. Dig a trench in the ground, laid with the wind, about a foot long, 4 inches wide, and 6 inches deep. Start the fire in this trench gradually, piling on the heavier wood as the fire grows. When the trench is full of burning wood, allow it a few minutes to burn down to coals and stop blazing high. Then rest the meat can and cup over the trench and start cooking. Either may be supported, if necessary, with green sticks. If you can not scrape a trench in the soil, build one up out of rocks or with two parallel logs.

The following recipes have been furnished from the office of the Quartermaster General, United States Army:

Coffee.—Fill the cup two-thirds full of water and bring to a boil. Add one heaping spoonful of coffee and stir well, adding one spoonful of sugar if desired. Boil five minutes and then set it to the side of the fire to simmer for about 10 minutes. Then, to clear the coffee, throw in a spoonful or two of cold water. This coffee is of medium strength and is within the limit of the ration if made but twice a day.

Cocoa.—Take two-thirds of a cupful of water, bring to a boil, add one heaping spoonful of cocoa, and stir until dissolved. Add one spoonful of sugar, if desired, and boil for five minutes.

Chocolate.—Take two-thirds of a cupful of water, bring to a boil, add a piece of chocolate about the size of a hickory nut, breaking or cutting it into small pieces and stirring until dissolved. Add one spoonful of sugar, if desired, and boil for five minutes.

Tea.—Take two-thirds of a cupful of water, bring to a boil, add one-half of a level spoonful of tea, and then let it stand or “draw” for three minutes. If allowed to stand longer the tea will get bitter, unless separated from the tea leaves.

MEATS.

Bacon.—Cut slices about five to the inch, three of which should generally be sufficient for one man for one meal. Place in a meat can with about one-half inch of cold water. Let come to a boil and then pour the water off. Fry over a brisk fire, turning the bacon once and quickly browning it. Remove the bacon to lid of meat can, leaving the grease for frying potatoes, onions, rice, flapjacks, etc., according to recipe.

Fresh meat (to fry).—To fry, a small amount of grease (one to two spoonfuls) is necessary. Put grease in the meat can and let come to a smoking temperature, then drop in the steak and, if about one-half inch thick, let fry for about one minute before turning, depending upon whether it is desired it shall be rare, medium, or well done. Then turn and fry briskly as before. Salt and pepper to taste.

Applies to beef, veal, pork, mutton, venison, etc.

Fresh meat (to broil).—Cut in slices about one inch thick, from half as large as the hand to four times that size. Sharpen a stick or branch of convenient length—say, from two to four

feet long—and weave the point of the stick through the steak several times, so that it may be readily turned over a few brisk coals or on the windward side of a small fire. Allow to brown nicely, turning frequently. Salt and pepper to taste. Meat with considerable fat is preferred, though any meat may be broiled in this manner.

Fresh meat (to stew).—Cut into chunks from one-half inch to one inch cubes. Fill cup about one-third full of meat and cover with about one inch of water. Let boil or simmer about one hour, or until tender. Add such fibrous vegetables as carrots, turnips, or cabbage, cut into small chunks, soon after the meat is put on to boil, and potatoes, onions, or other tender vegetables when the meat is about half done. Amount of vegetables to be added, about the same as meat, depending upon supply and taste. Salt and pepper to taste. Applies to all fresh meats and fowls. The proportion of meat and vegetables used varies with their abundance, and fixed quantities can not be adhered to. Fresh fish can be handled as above, except that it is cooked much quicker, and potatoes and onions and canned corn are the only vegetables generally used with it, thus making a chowder. A slice of bacon would greatly improve the flavor. May be conveniently cooked in meat can or cup.

VEGETABLES.

Potatoes (fried).—Take two medium-sized potatoes or one large one (about one-half pound), peel and cut into slices about one-fourth inch thick and scatter well in the meat can in which the grease remains after frying the bacon. Add sufficient water to half cover the potatoes, cover with the lid to keep the moisture in, and let come to a boil for about 15 to 20 minutes. Remove the cover and dry as desired. Salt and pepper to taste. During the cooking the bacon already prepared may be kept on the cover, which is most conveniently placed bottom side up over the cooking vegetables.

Onions (fried).—Same as potatoes.

Potatoes (boiled).—Peel two medium-sized potatoes (about one-half pound) or one large one, and cut in coarse chunks of about the same size—say $1\frac{1}{2}$ inch cubes. Place in meat can and three-fourths fill with water. Cover with lid and let boil

or simmer for 15 or 20 minutes. They are done when easily penetrated with a sharp stick. Pour off the water and let dry out for one or two minutes over hot ashes or light coals.

Potatoes (baked).—Take two medium-sized potatoes (about one-half pound) or one large one cut in half. Lay in a bed of light coals and cover with same and smother with ashes. Do not disturb for 30 or 40 minutes, when they should be done.

Canned tomatoes.—One 2-pound can is generally sufficient for five men.

Stew.—Pour into the meat can one man's allowance of tomatoes and add about two large hardtacks broken into small pieces and let come to a boil. Add salt and pepper to taste, or add a pinch of salt and one-fourth spoonful of sugar.

Or, having fried the bacon, pour the tomatoes into the meat can, the grease remaining, and add, if desired, two broken hardtacks. Set over a brisk fire and let come to a boil.

Or, heat the tomatoes just as they come from the can, adding two pinches of salt and one-half spoonful of sugar, if desired.

Or, especially in hot weather, eaten cold with hard bread, they are very palatable.

Rice.—Take about two-thirds of a cupful of water, bring to a boil, add 4 heaping spoonfuls of rice, and boil until the grains are soft enough to be easily mashed between the fingers (about 20 minutes). Add two pinches of salt and, after stirring, pour off the water and empty rice out on meat can. Bacon grease or sugar may be added.

Corn meal, fine hominy, oatmeal.—Take about one-third of a cupful of water, bring to a boil, add 4 heaping spoonfuls of the meal or hominy, and boil about 20 minutes. Then add about two pinches of salt and stir well.

Dried beans and peas.—Put 4 heaping spoonfuls in about two-thirds of a cupful of water and boil until soft. This generally takes from three to four hours. Add one pinch of salt. About half an hour before the beans are done add one slice of bacon.

HOT BREADS.

Flapjacks.—Take 6 spoonfuls of flour and one-third spoonful of baking powder and mix thoroughly (or dry mix in a large pan before issue, at the rate of 25 pounds of flour and 3 half cans of

baking powder for 100 men). Add sufficient cold water to make a batter that will drip freely from the spoon, adding a pinch of salt. Pour into the meat can, which should contain the grease from fried bacon or a spoonful of butter or fat, and place over medium hot coals sufficient to bake, so that in from 5 to 7 minutes the flapjack may be turned by a quick toss of the pan. Fry from 5 to 7 minutes longer, or until by examination it is found to be done.

Hoecake.—Hoecake is made exactly the same as flapjacks by substituting *corn meal* for *flour*.

Emergency rations.—Detailed instructions as to the manner of preparing the emergency ration are found on the label of each can. Remember that even a very limited amount of bacon or hard bread, or both, consumed with the emergency ration makes it far more palatable, and generally extends the period during which it can be consumed with relish. For this reason it would be better to husband the supply of hard bread and bacon for use with the emergency ration when it becomes evident that the latter must be consumed rather than to retain the emergency ration to the last extremity and force its exclusive use for a longer period than two or three days.

Section 3. The Forage Ration.

"1077, Army Regulations.—The forage ration for a horse is 14 pounds of hay and 12 pounds of oats, corn, or barley, and 3½ pounds of straw (or hay) for bedding; for a Field Artillery horse of the heavy-draft type, weighing 1,300 pounds or over, 17 pounds of hay and 14 pounds of oats, corn, or barley, and 3½ pounds of straw (or hay) for bedding; for a mule, 14 pounds of hay and 9 pounds of oats, corn, or barley, and 3½ pounds of straw (or hay) for bedding. To each animal 3 pounds of bran may be issued in lieu of that quantity of grain.

"The commanding officer may, in his discretion, vary the proportions of the components of the ration (1 pound of grain, 1½ pounds of hay, and 2 pounds of straw being taken as equivalents), and in the field may substitute other recognized articles of forage obtained locally, the variation or the substitution not to exceed the money value of the components of the ration at the contract rates in effect at the time of change.

"1078, *Army Regulations*.—Where grazing is practicable, or when little work is required of the animals, commanding officers will reduce the forage ration. When, on the other hand, conditions demand it, they are authorized to increase the ration, not in excess, however, of savings made."

In the field the authorized allowances must often be reduced and supplemented by grazing and other kinds of food, such as green forage, beans, peas, rice, palay, wheat, and rye. Wheat and rye should be crushed and fed sparingly (about one-fourth of the allowance). For unshelled corn, add about one-quarter weight.

On the march the grain ration is the only forage carried. It consists of 12 pounds of grain for each horse and 9 pounds of grain for each mule. Recourse must be had to grazing if it is not possible to procure long forage in the country traversed.

In campaign a command carries as a part of its normal equipment the following forage:

(a) For each draft animal: On each vehicle a *reserve* of one day's grain ration for its draft animals.

(b) On animals and vehicles: A portion of their grain ration issued the night before, for a noonday feed.

(c) In the ration section of the field train, for each animal, two days' grain rations.

(d) In supply train of an Infantry division two days' grain rations, and of a Cavalry division one day's grain ration.

CHAPTER IV.

PERSONAL HYGIENE AND CARE OF THE FEET.

Personal Hygiene.

History shows that in almost every war many more men die of disease than from wounds received in battle. Much of this disease is preventable and is due either to the ignorance or carelessness of the person who has the disease or of other persons about him. It is a terrible truth that one man who violates any of the great rules of health may be the means of killing many more of his comrades than are killed by the bullets of the enemy.

It is therefore most important that every soldier should learn how to take care of his health when in the field and that he should also insist that his comrades do not violate any of the rules prescribed for this purpose.

A great many diseases are due to germs, which are either little animals or little plants so very small that they can only be seen by aid of the microscope. All diseases caused by germs are "catching." All other diseases are not "catching."

There are only five ways of catching disease:

(a) Getting certain germs on the body by touching some one or something which has them on it. Thus, one may catch venereal diseases, smallpox, measles, scarlet fever, chicken pox, mumps, boils, body lice, ringworm, barber's itch, dhobie itch, and some other diseases. Wounds are infected in this manner.

(b) Breathing in certain germs which float in the air. In this way one may catch pneumonia, consumption, influenza, diphtheria, whooping cough, tonsillitis, spinal meningitis, measles, and certain other diseases.

(c) Taking certain germs in through the mouth in eating or drinking. Dysentery, cholera, typhoid fever, diarrhea, and intestinal worms may be caught in this manner.

(d) Having certain germs injected into the body by the bites of insects, such as mosquitoes, fleas, and bedbugs. Malaria, yellow fever, dengue fever, and bubonic plague may be caught in this way.

(e) Inheriting the germ from one's parents.

Persons may have these germs sometimes without apparently being sick with any disease. Such persons and persons who are sick with the diseases are a great source of danger to others about them. Germs which multiply in such persons are found in their urine and excretions from the bowels; in discharges from ulcers and abscesses; in the spit or particles coughed or sneezed into the air; in the perspiration or scales from the skin; and in the blood sucked up by biting insects.

Those who have taken care of their health and who have not become weakened by bad habits, exposure, and fatigue are not only less liable to catch disease, but are more apt to recover when taken sick.

Knowing all these things, the soldier can understand the reasons for the following rules and how important it is that they should be carried out by each and every person:

Stay away from persons having "catching" diseases.

If you have any disease, don't try to cure it yourself, but go to the surgeon. Insist that other soldiers do likewise.

Typhoid fever is one of the most dangerous and common camp diseases. Modern medicine has, however, discovered an effective preventative for this disease in the typhoid prophylactic, which renders the person immune from typhoid fever. The treatment consists in injecting into the arm a preventative serum. The injection is given three times at 10-day intervals.

Association with lewd women is dangerous. It may result in disabling you for life. It is the cause of a disease (syphilis) which may be transmitted by a parent to his children. Soldiers with venereal diseases should not use basins or toilet articles used by others, as the germs of these diseases if gotten into the eye very often cause blindness. Likewise, if they use the same drinking cup used by others they may give others the disease.

They should promptly report their trouble to the surgeon, that they may receive the best medical advice and attention.

Should a soldier expose himself to infection by having intercourse with an unknown woman, he should report as soon as possible afterwards to the regimental infirmary for prophylactic treatment, which, if taken within a few hours after intercourse, will prevent to a large degree the liability of contracting any disease.

Cooked germs are dead and therefore harmless. Water, even when clear, may be alive with deadly germs. Therefore, when the conditions are such that the commanding officer orders all drinking water to be boiled, be careful to live up to this order.

Use the latrines and don't go elsewhere to relieve yourself. In open latrines cover your deposit with dirt, as it breeds flies and may also be full of germs.

Flies carry germs from one place to another. Therefore see that your food and mess kit are protected from them.

All slops and scraps of food scattered about camp soon produce bad odors and draw flies. Therefore do your part toward keeping the camp free from disease by carefully depositing such refuse in the pits or cans used for this purpose.

Urine only in the latrines, or in the cans set out for this purpose, never on the ground around camp, because it not only causes bad smells but urine sometimes contains the germs of "catching" diseases.

Soapy water thrown on the ground soon produces bad odors. Therefore in camps of several days' duration this water should be thrown in covered pits or in cans used for this purpose.

As certain mosquitoes can transmit malaria and yellow fever, use your mosquito bar for this reason as well as for personal comfort.

Keep your mouth clean by brushing your teeth once or twice a day. It helps to prevent the teeth from decaying. Decayed teeth cause toothache. They also lead one to swallow food without properly chewing it, and this leads to stomach troubles of various kinds. Food left around and between the teeth is bad for the teeth and forms good breeding places for germs.

Keep the skin clean. Through the pores of the skin the body gets rid of much waste and poisonous matter. Therefore re-

move this and keep the pores open by bathing once every day, if possible. If water is scarce, rub the body over with a wet towel. If no water is at hand, take a dry rub. Wash carefully the armpits, between the legs, and under the foreskin, as this will prevent chafing.

The skin protects the sensitive parts underneath from injury and helps to keep out germs. Therefore when blisters are formed don't tear off the skin. Insert a needle under the skin a little distance back from the blister and push it through to the opposite side. Press out the liquid through the holes thus formed. Heat the needle red hot first, with a match or candle, to kill the germs.

When the skin is broken (in cuts and wounds) keep the opening covered with a bandage to keep out germs and dirt; otherwise the sore may fester. Pus is always caused by germs.

Keep your hair short. Long hair and a long beard in the field generally means a dirty head and a dirty face and favors skin diseases, lice, and dandruff.

Don't let any part of the body become chilled, as this very often is the direct cause of diarrhea, dysentery, pneumonia, rheumatism, and other diseases.

Wet clothes may be worn while marching or exercising without bad results, but there is great danger if one rests in wet clothing, as the body may become chilled.

Don't sit or lie or sleep directly on damp ground, as this is sure to chill the body.

When hot or perspiring or when wearing damp clothes, don't remain where a breeze can strike you. You are sure to become chilled.

Every day, if possible, hang your blanket and clothing out to air in the sun; shake or beat them with a small stick. Germs and vermin don't like this treatment, but damp, musty clothing suits them very well. Wash your shirts, underwear, and socks frequently. The danger of blood poisoning from a wound is greatly increased if the bullet passes through dirty clothes.

Ditch your tent as soon as you can, particularly a shelter tent, even if you camp for one night only. Otherwise a little rain may ruin a whole night's rest.

Always prepare your bed before dark. Level off the ground and scrape out a little hollow for your hips. Get some straw

or dry grass if possible. Green grass or branches from trees are better than nothing. Sleep on your poncho. This keeps the dampness from coming up from the ground and chilling the body. Every minute spent in making a good bed means about an hour's good rest later on.

Avoid the food and drink found for sale in the cheap stands about camp. The quality is generally bad, and it is often prepared in filthy places by very dirty persons.

The use of intoxicating liquor is particularly dangerous in the field. Its excessive use, even at long intervals, breaks down one's system. Drinking men are more apt to get sick and less liable to get well than are their more sober comrades. If alcohol is taken at all, it is best after the work of the day is over. It should never be taken when the body is exposed to severe cold, as it diminishes the resistance of the body. Hot tea or coffee is much preferable under these circumstances.

Care of the Feet.

A soldier can not march with sore feet, and marching is the main part of an infantryman's daily duty in the field. All soldiers should be familiar with the proper methods of caring for the feet. Sore feet are generally due to carelessness, neglect, or ignorance on the part of the soldier.

The most important factor in the care of the feet and the marching ability of the soldier is the shoe. Civilian shoes, particularly light, patent leather, or low shoes, are sure to cause injury and in time will ruin a man's foot. Only the marching shoe issued by the Quartermaster Corps should be worn, and they must be properly fitted to the individual. It will not suffice to order a marching shoe of the same size as one's ordinary civilian shoes, for it must be remembered that a soldier may have to march many miles daily over rough roads and carrying a heavy pack. The pack itself causes the foot to spread out to a larger size, and the rough roads give so much exercise to the muscles of the feet that they swell greatly through the increased blood supply. (For directions as to measuring the foot for the marching shoe see General Order No. 26, War Department, 1912, a copy of which should be on hand in each company.)

Do not start out on a march wearing new shoes. This is a frequent cause of sore feet. New shoes should be properly broken in before beginning a march by wearing them for several hours daily for a week before the march, and they should be adapted to the contours of the feet by stretching them with shoe stretchers with adjustable knobs to take the pressure off painful corns and bunions. Such stretchers are issued by the Quartermaster Corps, and there should be one or more pair in every company of infantry. Should this be impracticable, then the following is suggested:

The soldier stands in his new shoes in about 2½ inches of water for about five minutes until the leather is thoroughly pliable and moist; he should then walk for about an hour on a level surface, letting the shoes dry on his feet, to the irregularities of which the leather is thus molded in the same way as it was previously molded over the shoe last. On taking the shoes off a very little neat's-foot oil should be rubbed into the leather to prevent its hardening and cracking.

If it is desired to waterproof shoes at any time, a considerable amount of neat's-foot oil should be rubbed into the leather. Waterproof leather causes the feet of some men to perspire unduly and keeps them constantly soft.

Light woolen or heavy woolen socks will habitually be worn for marching. Cotton socks will not be worn unless specifically ordered by the surgeon. The socks will be large enough to permit free movement of the toes, but not so loose as to permit of wrinkling. Darned socks, or socks with holes in them, will not be worn in marching.

Until the feet have hardened they should be dusted with foot powder, which can be obtained at the regimental infirmary, before each day's march. Clean socks should be worn daily.

As soon as possible after reaching camp after a day of marching the feet should be washed with soap and water, and the soldier should put on a dry pair of socks and his extra pair of shoes from his surplus kit. If the skin is tender, or the feet perspire, wash with warm salt water or alum water, but do not soak the feet a long time, as this, although very comforting at the time, tends to keep them soft. Should blisters appear on the feet, prick and evacuate them by pricking at the lower edge with a pin which has been passed through the flame of a match

and cover them with zinc oxide plaster applied hot. This plaster can be obtained on request at the regimental infirmary. If serious abrasions appear on the feet, or corns, bunions, and ingrowing nails cause trouble, have your name placed on sick report and apply to the surgeon for treatment. Cut the toe nails square (fairly close in the middle, but leaving the sides somewhat longer), as this prevents ingrowing nails.

CHAPTER V.

EXTRACTS FROM PROVISIONAL DRILL AND SERVICE REGULATIONS FOR FIELD ARTILLERY (HORSE AND LIGHT), 1916.

[Paragraph numbers refer to Drill and Service Regulations for Field Artillery.]

Section 1. Definitions.

56. Alignment: A straight line upon which several men, teams, carriages, or bodies of troops are formed or are to be formed; or the formation of such line; or the dressing of several elements upon a straight line.

Base: The element on which a movement is regulated or on which a formation is made.

Center: The middle point or element of a command.

Column: A formation in which the elements are placed one behind another.

Conduct of fire: The employment of the technical means necessary to cause fire of the desired nature to be brought to bear upon the target.

Depth: The space from head to rear of any formation, including the leading and rear elements. The depth of a man dismounted is 12 inches.

Disposition: The arrangement of the elements in a formation.

Distance: Open space between elements in the direction of depth.

Element: One of the component parts of a large unit—as a file, gun squad, team, carriage, section, platoon, battery, etc.

Facing distance: About 14 inches, i. e., the difference between

the front of a man in ranks, including his interval, and his depth.

File: Two men—the front-rank man and the corresponding man of the rear rank. The front-rank man is the **file leader**.

A file which has no rear-rank man is a **blank file**. The term **files** applies also to individual men in single-rank formation. A single mounted man in ranks is also called a file.

File closers: The men who, in dismounted formations, are posted 2 yards in rear of the rear rank in line.

Fire direction: The tactical direction of one or more fire units with a view of bringing their fire to bear at the right place at the right time.

Fire discipline: That condition resulting from training and practice which insures an orderly and efficient working of the personnel in the delivery of fire.

Flank: The right or left of a command in line or column; also the element on the right or left of a line.

By the enemy's right (left) **flank** is meant the flank which the enemy himself would so designate.

Formation: Arrangement of the elements of a command in their order in line, in column, or for battle.

Front: The space in width occupied by an element either in line or column. The term **front** denotes the direction of the enemy. The front of a man dismounted is 22 inches.

The **front** of a gun unlimbered is the direction in which the muzzle points; of a limber or of a carriage limbered, the direction in which the pole points.

Guide: An officer, noncommissioned officer, or private upon whom a command or an element thereof regulates its march.

Head: The leading element of a column, in whatever direction the column is facing.

Interval: Open space between elements abreast of each other.

Laying: The process of pointing a gun for range and directions, so as to cause the trajectory to pass through the target.

Left: The left extremity or element of a body of troops.

Line: A formation in which the different elements are abreast of each other. When the elements are in column the formation is called a **line of columns**.

Maneuver: A movement executed by a battery or larger unit for the purpose of changing from one formation to another.

Pace: Thirty inches; the length of the full step in quick time.

Rank: A line of men, horses, teams, or carriages abreast of each other.

Right: The right extremity or element of a body of troops.

Salvo: A single discharge from each of the guns of a battery or other unit fired in regular order from one flank to the other, with intervals of about two seconds.

Tail: The rear element of a column, in whatever direction the column is facing.

Volley: The rapid discharge of a certain indicated number of rounds, by each gun of a battery or other unit, each gun firing without regard to the others.

Section 2. General.

OBJECT OF THE INSTRUCTION.

1. The reason for the existence of Field Artillery is its ability to assist the other arms, especially the Infantry, upon the field of battle.

The degree to which the Field Artillery prepares itself to render this assistance is, then, the measure of its training. No refinements of drill-ground instructions or other minor details must be allowed to obscure this definite object or to impede progress toward its attainment.

2. To enable it to render effective assistance upon the battle-field artillery must be able, first, to march rapidly and in good order and to establish itself, promptly and without confusion, in such positions as will best utilize the available terrain; second, to deliver an effective and overpowering fire upon any designated part of the enemy's position.

Thorough training in marching, camping, reconnaissance and communication service, fire discipline, conduct of fire and fire direction, carried out over varied country, is essential to the attainment of these qualifications.

3. An additional object of instruction is to develop resourcefulness, initiative, and self-reliance on the part of field artillerymen of all grades.

4. These regulations prescribe a method of training in the ordinary duties pertaining to the service of Field Artillery. The personnel must be so thoroughly drilled that in the excitement

of action the duties will be performed as a matter of second nature.

The regulations also outline general principles according to which Field Artillery is to be handled and fought. A guide is thus furnished as to the best way of dealing with the usual problems which arise. But every problem which arises in service has its own best solution, and this solution must be evolved by the officer on the spot. His success will depend upon the extent to which he has prepared himself by previous thought and study and by previous practice in the solution of similar problems.

5. Instruction in peace must therefore be conducted with a view, first, of drilling the personnel thoroughly in their habitual duties; second, of affording officers and men practice and experience in dealing with the situations and difficulties apt to arise in campaign.

SEQUENCE AND METHODS OF INSTRUCTION.

8. A progressive order will be followed in all Field Artillery instruction. The annual course of instruction should commence with the smallest unit and proceed to the larger ones in succession, culminating in the field maneuvers.

9. The efficiency of an instructor is measured not only by his knowledge of his subject but by his ability to hold the attention of those whom he is endeavoring to instruct. When the men lose interest and their attention wanders, continuation of the exercise is useless. Hence, short and frequent drills are better than long ones, and effort must be made so to vary the exercises as to avoid monotony.

10. The instructor will always maintain a military bearing and, by a quiet, firm demeanor, set a proper example to the men. Faults should be corrected gradually, without nagging or shouting.

12. Thorough training of the individual soldier is the basis of efficiency. Great precision and attention to detail are essential in this instruction in order that the soldier may acquire that habit of implicit obedience to orders and of accurate performance of his individual duties which is indispensable in combined training.

13. Instruction of the gun squad as a whole will not be taken up to the exclusion of individual training until the men are thoroughly proficient in the nomenclature and operation of all those parts of the guns, instruments, and other matériel which the cannoneers are called upon to handle in actual firing.

Drivers will be thoroughly instructed in equitation before taking up drill with pairs. Similarly, they must understand the principles of managing the off horse and be able to handle the pair before taking up the team hitched.

14. So far as concerns the enlisted personnel, the most important element of a battery's efficiency on the battle field is its fire discipline. The basis of good fire discipline, as of all other matters, is thorough individual instruction, and it can only be secured and maintained by constant and vigorous drills and other exercises. To this end gun squads will be given daily such exercises as will serve to fix their attention and cultivate their dexterity.

Efficient gun squads can not be improvised. The duties of cannoneers and the manual dexterity required for their performance are easily forgotten. So long as there are drivers for the gun sections, each battery must constantly maintain four thoroughly instructed gun squads.

15. During drill hours instruction will be so arranged that neither men nor horses will be permitted to remain idle.

16. As soon as practicable after the pieces, caissons, or other Artillery matériel have been used, they will be properly cleaned, put in order, and inspected by an officer. When stables are held after drill, the gunners and such other men as may be needed will be detailed for the purpose of cleaning and placing the Artillery matériel in proper order, and will clean the same during stables.

17. Both morning and afternoon hours will be utilized for instruction, sufficient time being allowed for the police of barracks, stables, and grounds, and for the care of the personal equipments and effects of the men. All work should normally be done under the immediate direction of noncommissioned officers and under the supervision of officers.

TRAINING OF NONCOMMISSIONED OFFICERS.

20. Exceptional care and attention will be devoted by battery commanders to the selection and training of candidates for

appointment, as corporals and of corporals to fit them for duty as sergeants. In each battery a special course of instruction will be given by one of the lieutenants. This course will be considered the equivalent of the course in the noncommissioned officers' school.

21. The corporals and privates selected will be instructed according to a schedule submitted by each battery commander and approved by the regimental commander or by the senior Field Artillery officer present with the command.

22. The course for both selected privates and selected corporals should include such subjects as: Dismounted instruction to include all of Part II—Swimming; Drill in firing commands; The cannoneer; Care of matériel; Equitation; Care and management of horses; The driver; Care of harness and saddlery; Castrametation; First aid; Personal hygiene; Care of colthing and equipment. In addition, the course for selected corporals will include such subjects as: Duties of chiefs of section on the march; in camp; in the firing battery; with respect to discipline and property responsibility.

TRAINING AND INSPECTION OF RECRUITS.

23. All instruction of recruits will be by battery. When it is possible to do so, recruits will be assigned to batteries in detachments of not less than 30 men.

24. Every phase of the instruction of recruits will be under the immediate supervision of an officer. After the recruits have been under instruction a sufficient length of time to enable the battery commander to form an idea as to their capability they will be temporarily divided into classes of cannoneers and drivers. This division will be made permanent prior to the second inspection. In making this division the battery commander will consider the requirements of the service as well as the capabilities of the individual men.

25. Except in active operations or emergencies, recruits will not be placed on rosters for daily duties such as guard, fatigue, police, etc., until they are qualified for permanent assignment to duties in the sections. But such duties as guard, police, etc., will be made subjects of instruction.

26. To determine whether or not the recruits have been properly trained, two inspections will be held by the regimental commander, the battalion commander being present, or by the battalion commander in the absence of the regimental commander.

The first inspection will include the subjects enumerated in paragraph 28. The second inspection will be held for cannoneers and drivers separately and will include the subjects enumerated in paragraph 29.

These inspections should be most thorough and should include everything prescribed by these drill regulations in the subjects enumerated. At the termination of each inspection, or at the end of each day when the inspection requires several days, a detailed critique will be held by the inspecting officer. All officers belonging to the battery whose recruits are being inspected will be present during the inspection and the subsequent critique. By means of this inspection Field Artillery commanders will be able to obtain a very great degree of uniformity in the instruction of the units of their command.

27. The first inspection will take place not less than three months nor more than four months after the recruits have joined the battery on a date to be designated by the regimental commander or senior Artillery officer present with the command.

28. The first inspection will be for all the recruits and will consist of a detailed examination and inspection in the following subjects:

1. Dismounted inspection under arms.
2. Manual of the pistol.
3. Setting up exercises, to include all exercises prescribed in the Manual of Physical Training.
4. Swimming, if facilities are available.
5. Running one-half mile.
6. Customs and courtesies of the service.
7. Dismounted drill, to include the execution of each movement prescribed for the squad and for the battery dismounted.
8. Inspection of barracks or camp, the recruits standing by their beds with their equipment displayed.
9. Inspection of all articles included in the field kit.
10. Packing; rolling the mounted and dismounted blanket roll; rolling the slicker.

11. Shelter-tent pitching.

12. Individual instruction as cannoneers, to include sufficient instruction to enable them to qualify as second-class gunners.

13. Drill of the gun squads in all the exercises preliminary to the service of the piece, to include the execution of each movement described.

14. Care of horses:

(a) Questions on the general rules and principles of feeding, watering, care, and grooming of horses.

(b) Grooming by detail of one horse by each recruit.

15. Equitation, to include the "Soldier mounted."

16. Care of leather equipment as demonstrated by actually cleaning a saddle and bridle.

17. Fitting a saddle and bridle to a horse.

29. The second inspection will be held not less than five months nor more than six months after the recruits have joined the battery, on a date to be designated by the regimental commander or senior Artillery officer present with the command, and will include:

(A) FOR ALL RECRUITS.

1. Dismounted inspection under arms.

2. Setting-up exercises, to include all exercises described in the Manual of Physical Training.

3. Customs and courtesies of the service.

4. Dismounted drill, to include the execution of each movement described for the squad and for the battery dismounted.

5. Guard duty, to determine whether the recruit understands his duties as a sentinel.

6. First aid; Hygiene; Care of the person.

7. Care and use of the pistol, to include the firing of two scores, slow fire, at 25 yards.

8. Pitching, striking, and packing battery tentage.

9. Inspection of clothing and equipment.

10. Individual cooking, to include the preparation of coffee, bacon, and potatoes.

(B) FOR CANNONEERS ONLY.

1. Care, cleaning, and nomenclature of matériel.

2. Rolling cannoneer's rolls and packing them for transportation.

3. Elementary gunnery, to include determining whether the recruits thoroughly understand the principles, mechanisms, methods of fire, etc., given in firing instruction.

4. One battery problem involving the fire of service ammunition by gun squads the principal positions in which are filled by the recruits. If ammunition be not available, or if firing be impracticable, this subject will be replaced by drill in simulated fire.

5. Individual instruction as cannoneers, to include sufficient instruction to enable them to qualify as first-class gunners.

(C) FOR DRIVERS ONLY.

1. Nomenclature, cleaning, and fitting of harness.

2. Harnessing and unharnessing.

3. Rolling driver's rolls and packing equipment on the saddle.

4. Handling a single pair at the walk and trot in turns and about; increasing the gait; decreasing the gait; halts; and movements to the front from the halt.

5. Handling a pair in a team hitched, to include the execution at the walk and trot of all movements described in the "Battery mounted."

6. Questions on the care of horses on the march and in camp, with especial reference to shoulders and backs, feeding and watering.

30. If the results of either of these inspections are unsatisfactory, the inspecting officer will require a further period of training at the termination of which another inspection will be held.

MISCELLANEOUS TRAINING.

31. While first place must be given to purely Artillery instruction, the personnel must also be thoroughly trained in all other duties which may be required of Field Artillery. Among the most important are those incident to the march and the camp. In beginning training in these duties it should be borne in mind that the principal object is instruction, not distance marched. The earlier marches should, therefore, be very short in order that the personnel may be in condition to profit by instruction in the care of animals and matériel, establishing camp, individual cooking, etc. Similarly, instruction in each of the several subjects should be deliberate in the beginning.

Painstaking instruction until the men thoroughly understand what they are to do and are accurate in doing it is the only safe foundation upon which to develop speed, which then becomes a matter of practice.

Section 3. General Rules for Formations.

DISMOUNTED INSTRUCTION.

57. Formations are habitually in double rank; the men always fall in at attention.

58. The interval between men in ranks is 4 inches and between ranks in flank column is 30 inches, measured from elbow to elbow. The distance between ranks is 40 inches, measured from the back of the man in front to the breast of the man in rear.

The front of a man is assumed to be 22 inches, or, including the interval, 26 inches; his depth, about 12 inches.

59. To secure uniformity of interval between files when falling in and in the alignments, each man places the palm of the left hand upon the hip, fingers pointing downward, thumb to the front. In falling in, the hand is dropped by the side as soon as the man next on the left has his interval; in the alignments, at the command front.

60. Unless otherwise announced, the guide of a battery or subdivision of a battery in line is right.

In successive formations into line, the guide is toward the point of rest.

To march with the guide other than as prescribed above, or to change the guide: Guide right (left).

The announcement of the guide, when given in connection with a movement, follows the command of execution for that movement.

61. When marching by the flank from line, the leading man of the front rank is, without indication, the guide of the column.

During the oblique march the leading man of the leading rank is, without indication, the guide.

When marching in line, the front-rank man on the designated flank is the guide.

MOUNTED INSTRUCTION.

33. Movements that may be executed toward either flank are explained as toward but one flank, it being necessary to substitute left for right, or the reverse, to have the command and explanation of the corresponding movement toward the other flank.

34. Any movement may be executed either from the halt or when marching, unless otherwise prescribed.

35. If the movement on foot be from the halt, or when marching in quick time, the command double time precedes the command march; if marching in double time, the command double time is omitted.

36. All mounted movements not specially excepted may be executed at the trot or gallop. The gallop is an exceptional gait for light artillery and should be used only for short distances.

37. The gait should habitually be increased or decreased progressively, the trot being executed from the walk and the gallop from the trot. If marching at the gallop the gait will be decreased to the trot, then to the walk, before halting; if marching at the trot, the same rule applies.

38. To execute a movement at the trot or gallop, the command trot or gallop precedes the command march, unless marching at the gait desired.

39. Movements or procedures explained for the smaller units are, in general, applicable to the larger ones when under instruction of the same character, the commands being modified so as to be adapted to the particular unit.

40. The intervals and distances prescribed in the text are in general such that, if marched by the flank from line, the elements will be in column at proper distances; or if marched by the flank from column, they will be in line at proper intervals. Similarly, if marching obliquely, a second oblique will place the elements in line or column, as the case may be, at proper intervals or distances. If, however, due to differences of length of elements, these conditions do not accurately obtain, the proper intervals or distances are gradually secured by appropriate modifications of the gait.

41. If, in forming elements abreast of each other, the commands: 1. **Battery** (Platoon, etc.), 2. **HALT**, be given during the movement, only those elements halt which have reached their new positions; the others continue the march and halt on reaching their positions.

42. For the purpose of correcting errors while marching, the instructor may command: 1. **In place**, 2. **HALT**; when all halt and stand fast. To resume the march, he commands: 1. **Resume**, 2. **MARCH**.

43. To revoke a preparatory command, or, being at a halt, to begin anew a movement improperly begun, the instructor commands: **AS YOU WERE**, at which the movement ceases and the former position is resumed.

44. If a change of formation requires a change of post of officers and noncommissioned officers, they proceed by the shortest routes to their posts in the new formation.

45. While the posts of officers and noncommissioned officers are specified in the text, as instructors they go wherever their presence is necessary.

46. Officers and noncommissioned officers commanding organizations or subdivisions thereof, when absent, are ordinarily replaced by the next in rank in their organization or subdivision.

47. For administrative purposes each unit of Field Artillery has its permanent designation, thus:

The First, Second, Third, Fourth, etc., Regiment of Field Artillery;

The First Battalion, Fifth Regiment of Field Artillery;

Battery D, Sixth Field Artillery;

The first, second, third, etc., platoon of a battery;

The first, second, third, fourth, etc., section of a battery.

For purposes of drill and maneuver, units will be designated by their temporary relative position in line or column, thus:

The right battery, left battalion;

The leading platoon, center battery;

The left section, right platoon.

The permanent numerical designation of units does not change as their relative order in line or column is changed, with the following exception:

After the pieces of a battery are unlimbered and established in line, they are designated from right to left as first piece, second piece, third piece, and fourth piece, or No. 1, No. 2, No. 3, and No. 4.

Section 4. Orders, Commands, and Signals.

ORDERS.

In these regulations an order embraces instructions or directions given orally or in writing in terms suited to the particular occasion and not prescribed herein.

Orders are employed only when the commands prescribed herein do not sufficiently indicate the will of the commanders.

COMMANDS.

38. There are two kinds of commands:

The preparatory command, such as forward, indicates the movement that is to be executed.

The command of execution, such as **MARCH**, **HALT**, causes the execution.

Preparatory commands are distinguished by italics, those of execution by CAPITALS.

49. The commands prescribed in the text are given by the instructor, except when otherwise specified.

50. To permit of the preparatory command being understood, a well-defined pause should be made between it and the command of execution. The duration of this pause depends in a measure upon the size of the body of troops under command. Ordinarily, in dismounted movements and in mounted movements executed from a halt, the pause should be brief and of uniform duration, as otherwise uncertainty is communicated to the ranks, and a ragged execution of the movement results.

51. The tone of command is animated, distinct, and of a loudness proportioned to the number of men under command. Indifference in giving commands leads to laxity in execution.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a firm brief tone.

In mounted movements the preparatory commands are more or less prolonged to insure their being heard; the command of execution is always prolonged.

When giving commands to troops it is usually best to face and look toward them.

52. When numbers are announced by voice as part of a command the thousands and hundreds are given separately, but the tens and units are combined thus:

25-----	Twenty-five.
400-----	Four hundred.
705-----	Seven hundred and five.
860-----	Eight hundred and sixty.
3000-----	Three thousand.
3200-----	Three, two hundred.
3250-----	Three, two hundred and fifty.
4050-----	Four thousand and fifty.

53. In transmitting numbers by telephone exact hundreds and thousands are so announced; of other numbers each digit is given separately. Thus—

400-----	Four hundred.
1800-----	One, eight hundred.
3000-----	Three thousand.
8225-----	Three, two, two, five.
4050-----	Four, zero, five, zero.

54. To secure uniformity, officers and noncommissioned officers are practiced in giving commands.

55. The bugle calls and prescribed arm signals are frequently used in instruction, in order that officers and men may readily recognize them.

501. Commands are given by the captain either verbally, or by arm, bugle, or whistle signals. When verbal commands are given, they may be supplemented by the appropriate signals.

502. Chiefs of platoon repeat the commands of the captain, or give appropriate commands to their platoons in time to insure the proper execution of the maneuver. The chiefs of platoon ordinarily give their commands verbally, supplemented, if necessary, by the appropriate arm signal, and see to it that the commands of the captain are understood and correctly executed by their platoons. If a chief of platoon does not hear a command, he governs himself by what he sees executed by the adjoining platoon.

503. Chiefs of section repeat the commands of the chiefs of platoon, or give appropriate commands to their sections in time to insure the proper execution of the maneuver. Chiefs of section ordinarily give their commands by arm signals, supplemented, if necessary, by verbal commands, and see to it that the command is understood and that it is correctly executed.

ARM SIGNALS.

504. Signals are ordinarily made with the right arm, but may be made with the left when more convenient; when made with the left arm the reins are taken temporarily in the right hand.

If the saber is in hand, the signals are made in a manner similar to that prescribed for the arm.

505. Ordinarily, before making a signal for the execution of a movement, the captain places himself where he can be seen by the battery, generally with his horse facing in the same direction as the team horses, and signals the attention with the whistle or bugle.

The signals prescribed for the different maneuvers are preparatory signals; for the signal of execution the arm is extended vertically and then lowered quickly to the side. If the movement involves a change in the direction of march, the captain moves his horse in the new direction on making the preparatory signal.

506. Preparatory signals:

Attention.—Extend the arm vertically and move it slowly back and forth from right to left.

Forward.—Extend the arm vertically and lower it to the front until horizontal.

By the right (left) flank.—Extend the arm vertically and lower it to the right (left) until horizontal.

Right (Left) about.—Extend the arm vertically and describe slowly a large horizontal circle with the hand; then extend the arm to the left (right) and describe a horizontal arc to front and right (left).

Countermarch.—Extend the arm vertically and describe quickly several horizontal circles with the hand.

Right sections forward.—Extend the arm vertically and then thrust several times to the front.

Right (Left) oblique.—Extend the arm obliquely upward to the right (left) and front, and then lower the arm, describing a vertical circle on the right (left) side of the horse.

To increase the gait.—Carry the hand to the shoulder, forearm vertical; extend the arm vertically from this position and repeat several times.

To decrease the gait.—Hold the arm horizontally above and in front of the forehead.

To indicate an increased or decreased gait for a maneuver, the appropriate signal is made just after the preparatory signal for the maneuver.

To halt.—Extend the arm vertically and hold it there until the signal is obeyed.

To change direction to the right (left).—Extend the arm vertically; lower it to the left (right) until horizontal and describe a horizontal arc to the front and right (left).

To close intervals.—Point to the section on which the intervals are to be closed, and then signal right (left) oblique, or left and right oblique, according as the intervals are to be closed on the right (left) section or on an interior section.

To extend intervals.—Point to the section on which intervals are to be extended, and then signal left (right) oblique, or right and left oblique, according as the intervals are to be extended on the right (left) section or on an interior section.

Right (Left) by section.—Point at the right (left) section and signal forward.

Right (Left) front into line.—Extend the arm vertically and describe several large vertical circles on the right (left) side of the horse.

Right (Left) into line.—Signal a change of direction to the right (left), followed by describing small circles with the hand while the arm is extended to the right (left).

Pieces front.—Extend the arm horizontally to the front and then move it several times through a small vertical arc.

Caissons front.—Extend the arm horizontally to the front and then move it several times through a small horizontal arc.

Flank column, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through a small horizontal arc.

Double section, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through a small vertical arc.

The signals for flank column, or double section, right (left) oblique, apply also for the formation of flank column or double section to the right (left) after limbering.

Action front (right, left, rear).—Extend the arm vertically; then lower quickly to the front (right, left, rear), and repeat several times.

Limber.—Extend both arms laterally.

WHISTLE SIGNALS.

507. Attention.—One long blast.

Cease firing.—One long blast. Given only when the battery is in position and firing service or subcaliber ammunition.

Special Detail Report.—Three long blasts.

Cannoneers Report.—Several short, sharp, and rapid blasts.

Chiefs of Section Report.—One long, followed by one short, blast, the whole signal repeated once.

Chiefs of Platoon Report.—Two long blasts.

At the signals for reporting, the personnel indicated report in person to the captain.

FLAG SIGNALS.

1. The International Morse Code will be used for all Field Artillery communication, except by semaphore.

2. The following abbreviations are prescribed and will be memorized for communication by any method with the exceptions noted:

- Error. (All methods but ardois and semaphore.)
- A Error. (Ardois and semaphore only.)
- A D Additional.
- A K T.... Draw ammunition from combat train.
- A L Draw ammunition from limbers.
- A M Ammunition going forward.
- A M C.... At my command.
- A P Aiming point.
- B (numerals).... Battery (so many) rounds.
- B S (numerals).... (Such) Battalion station.
- B L Battery from the left.
- B R Battery from the right.
- C C C.... Charge (mandatory at all times). Am about to charge if not instructed to contrary.
- C F Cease firing.
- C S Close station.
- C T Change target.
- D Down.
- D F Deflection.
- D T Double time. Rush. Hurry.
- F Commence firing.
- F C I (numerals).... On first piece close by (so much).
- F L Artillery fire is causing us losses.
- F O P (numerals).... On first piece open by (so much).
- G Move forward. Preparing to move forward.
- H H H.... Halt. Action suspended.
- I X Execute. Go ahead. Transmit.
- J I Report firing data.
- K Negative. No.
- K R Corrector.
- L Preparatory. Attention.
- I C I (numerals).... On fourth piece close by (so much).

- L O P (numerals)....On fourth piece open by (so much).
 L T.....Left.
 L L.....Left from the left.
 L R.....Left from the right.
 L E (numerals)....Less (so much).
 M D.....Move down.
 M L.....Move to your left.
 M R.....Move to your right.
 M U.....Move up.
 M O (numerals)....More (so much).
 N.....Annul. Cancel.
 O.....What is the (R. N., etc.)? Interrogatory. (Ardois and
 semaphore only.)
 ..—... What is the (R. N., etc.)? Interrogatory. (All meth-
 ods but ardois and semaphore.)
 P.....Affirmative. Yes.
 P S.....Percussion. Shrapnel.
 Q R Q....Send faster.
 Q R S....Send slower.
 Q R T....Cease sending.
 R.....Acknowledgment. Received.
 R S.....Regimental station.
 R L.....Right from the left.
 R R.....Right from the right.
 R N.....Range.
 R T.....Right.
 S.....Subtract.
 S C L (numerals)....On second piece close by (so much).
 S O P (numerals)....On second piece open by (so much).
 S H.....Shell.
 S I.....Site.
 S S S.....Support needed.
 T.....Target.
 T C L (numerals)....On third piece close by (so much).
 T O P (numerals)....On third piece open by (so much).
 U.....Up.
 Y (letter)....Such battery station

(3) The two-arm semaphore code (see illustrations on pages 219 and 220).

Section 5. School of the Soldier.—Dismounted.

65. The instructor explains briefly each movement, first executing it himself if practicable. He requires the recruits to take the proper positions unassisted and does not touch them for the purpose of correcting them, except when they are unable to correct themselves. He avoids keeping them too long at the same movement, although each should be understood before passing to another. He exacts by degrees the desired precision and uniformity.

66. In order that all may advance as rapidly as their abilities permit, the recruits are grouped according to proficiency as instruction progresses. Those who lack aptitude and quickness are separated from the others and placed under experienced drill masters.

INSTRUCTION WITHOUT ARMS.

67. For preliminary instruction a number of recruits, usually not exceeding three or four, are formed as a squad in single rank.

POSITION OF A SOLDIER, OR ATTENTION.

68. Heels on the same line and as near each other as the conformation of the man permits.

Feet turned out equally and forming an angle of about 45°.

Knees straight, without stiffness.

Hips level and drawn back slightly; body erect and resting equally on hips; chest lifted and arched; shoulders square and falling equally.

Arms and hands hanging naturally, thumb along the seam of the trousers.

Head erect and squarely to the front, chin drawn in so that the axis of the head and neck is vertical; eyes straight to the front.

Weight of the body resting equally upon the heels and balls of the feet.

TO ASSEMBLE.

70. To teach the recruits to assemble, the instructor requires them to place the palm of the left hand upon the hip, below the

belt when worn; he then places them on the same line so that the right arm of each man rests lightly against the elbow of the man next on his right, and then directs the left hand to be replaced by the side.

When the recruits have learned how to take their places, the instructor commands: **FALL IN.**

They assemble rapidly as above prescribed, each man dropping the left hand as soon as the man next on his left has his interval.

TO DISMISS THE RECRUITS.

71. Being in line at a halt: DISMISSED.

THE RESTS.

72. Being at a halt, the commands are: FALL OUT; REST; AT EASE; and 1. Parade, 2. REST.

At the command fall out, the men may leave the ranks, but are required to remain in the immediate vicinity. They resume their former places, at attention, at the command fall in.

At the command rest each man keeps one foot in place, but is not required to preserve silence or immobility.

At the command at ease each man keeps one foot in place and is required to preserve silence, but not immobility.

73. 1. Parade, 2. REST. Carry the right foot 6 inches straight to the rear, left knee slightly bent; clasp the hands, without constraint, in front of the center of the body, fingers joined, left hand uppermost, left thumb clasped by the thumb and forefinger of the right hand; preserve silence and steadiness of position.

74. To resume the attention: 1. Squad, 2. ATTENTION.

The men take the position of the soldier.

EYES RIGHT OR LEFT.

75. 1. Eyes, 2. RIGHT (LEFT), 3. FRONT.

At the command right, turn the head to the right oblique, eyes fixed on the line of eyes of the men in, or supposed to be in, the same rank. At the command front, turn the head and eyes to the front.

FACINGS.

76. To the flank: 1. Right (left), 2. FACE.

Raise slightly the left heel and right toe; face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot; place the left foot by the side of the right. Left face is executed on the left heel in the corresponding manner.

Right (left) half face is executed similarly, facing 45°.

"To face in marching" and advance, turn on the ball of either foot and step off with the other foot in the new line of direction; to face in marching without gaining ground in the new direction, turn on the ball of either foot and mark time.

77. To the rear: 1. About, 2. FACE.

Carry the toe of the right foot about a half foot-length to the rear and slightly to the left of the left heel without changing the position of the left foot; face to the rear, turning to the right on the left heel and right toe; place the right heel by the side of the left.

SALUTE WITH THE HAND.

78. 1. Hand, 2. SALUTE.

Raise the right hand smartly till the tip of the forefinger touches the lower part of the headdress or forehead above the right eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45°, hand and wrist straight; at the same time look toward the person saluted. **(TWO)** Drop the arm smartly by the side.

STEPS AND MARCHINGS.

79. All steps and marchings executed from a halt, except right step, begin with the left foot.

80. The length of the full step in quick time is 30 inches measured from heel to heel, and the cadence is at the rate of 120 steps per minute.

The length of the full step in double time is 36 inches; the cadence is at the rate of 180 steps per minute.

The instructor, when necessary, indicates the cadence of the step by calling **one, two, three, four, or left, right, the instant the left and right foot, respectively, should be planted.**

81. All steps and marchings and movements involving march are executed in quick time unless the squad be marching in double time, or double time be added to the command; in the latter case double time is added to the preparatory command. Example: 1. **Squad right, double time, 2. MARCH** (School of the Squad).

QUICK TIME.

83. Being at a halt, to march forward in quick time: 1. **Forward, 2. MARCH.**

At the command **forward**, shift the weight of the body to the right leg, left knee straight.

At the command **march**, move the left foot smartly straight forward 30 inches from the right, sole near the ground, and plant it without shock; next, in like manner, advance the right foot and plant it as above; continue the march. The arms swing naturally.

84. Being at a halt, or in march in quick time, to march in double time: 1. **Double time, 2. MARCH.**

If at a halt, at the first command shift the weight of the body to the right leg. At the command **march**, raise the fore-arms, fingers closed, to a horizontal position along the waist line; take up an easy run with the step and cadence of double time, allowing a natural swinging motion to the arms.

If marching in quick time, at the command **march**, given as either foot strikes the ground, take one step in quick time, and then step off in double time.

85. To resume the quick time: 1. **Quick time, 2. MARCH.**

At the command **march**, given as either foot strikes the ground, advance and plant the other foot in double time; resume the quick time, dropping the hands by the sides.

TO MARK TIME.

86. Being in march: 1. **Mark time, 2. MARCH.**

At the command **march**, given as either foot strikes the ground, advance and plant the other foot; bring up the foot in

rear and continue the cadence by alternately raising each foot about 2 inches and planting it on line with the other.

Being at a halt, at the command **march**, raise and plant the feet as described above.

THE HALF STEP.

87. 1. **Half step**, 2. **MARCH**.

Take steps of 15 inches in quick time, 18 inches in double time.

88. **Forward, half step, halt**, and **mark time** may be executed one from the other in quick or double time.

To resume the full step from half step or mark time: 1. **Forward**, 2. **MARCH**.

SIDE STEP.

89. Being at a halt or mark time: 1. **Right (left) step**, 2. **MARCH**.

Carry and plant the right foot 15 inches to the right; bring the left foot beside it and continue the movement in the cadence of quick time.

The side step is used for short distances only and is not executed in double time.

If at order arms, the side step is executed at trail without command.

BACK STEP.

90. Being at a halt or mark time: 1. **Backward**, 2. **MARCH**.

Take steps of 15 inches straight to the rear.

The back step is used for short distances only and is not executed in double time.

If at order arms, the back step is executed at trail without command.

TO HALT.

91. To arrest the march in quick or double time: 1. **Squad**, 2. **HALT**.

At the command **halt**, given as either foot strikes the ground, plant the other foot as in marching; raise and place the first foot by the side of the other. If in double time, drop the hands by the sides.

TO MARCH BY THE FLANK.

92. Being in march: 1. By the right (left) flank, 2. MARCH.

At the command march, given as the right foot strikes the ground, advance and plant the left foot, then face to the right in marching and step off in the new direction with the right foot.

TO MARCH TO THE REAR.

93. Being in march: 1. To the rear, 2. MARCH.

At the command march, given as the right foot strikes the ground, advance and plant the left foot; turn to the right about on the balls of both feet and immediately step off with the left foot.

If marching in double time, turn to the right about, taking four steps in place, keeping the cadence, and then step off with the left foot.

CHANGE STEP.

94. Being in march: 1. Change step, 2. MARCH.

At the command march, given as the right foot strikes the ground, advance and plant the left foot; plant the toe of the right foot near the heel of the left and step off with the left foot.

The change on the right foot is similarly executed, the command march being given as the left foot strikes the ground.

Section 6. Manual of the Pistol.

115. Both before and after drill or other exercise with the pistol, remove the magazine to see that it is empty, and draw back the slide and examine the bore to see that the pistol is not loaded.

116. The pistol being in the holster, to raise pistol: **1. Raise, 2. PISTOL.**

At the command raise, unbutton the flap of the holster and grasp the handle with the last three fingers of the right hand, back of the hand to the right. At the command, pistol, lift the pistol straight up, closing the thumb on the stock as it clears the holster, and extend the forefinger outside of the trigger

guard. Carry the pistol forward and upward to a position 6 inches in front of the point of the right shoulder, barrel to the rear and inclined forward about 30 degrees.

117. Being at raise pistol: 1. Return, 2. PISTOL.

If the pistol is loaded, see that the hammer is down or that the safety lock is in the locking position. Lower the pistol and raise the flap of the holster with the right hand. Insert the pistol in the holster and force it down. Button the flap with the right hand.

118. Being at raise pistol: 1. Inspection, 2. PISTOL.

Without deranging the position of the hand, rotate the pistol so that the sights move to the left, the barrel pointing to the right front and upward. With the thumb and forefinger of the left hand grasp the slide and pull it toward the body.

If the magazine is empty, as it should be, the slide stop will lock the slide in the open position. Drop the left hand by the side. Carry the pistol to a position about 6 inches in front of the center of the body, barrel pointing upward at an angle of about 45 degrees and to the left, wrist straight and as high as the breast.

When the inspection is completed, resume raise pistol, release the slide stop with the left thumb, and lower the hammer by pressing the trigger.

119. The pistol being in the holster: Prepare for inspection.

At this command the flap of the magazine pocket is unbuttoned and turned back with the left hand. Each man in turn executes raise pistol and inspection pistol in time to be at the latter position as the inspection of the man on his right is commenced by the inspector.

As soon as the inspector passes, the soldier completes inspection pistol, executes return pistol, and with the left hand closes the magazine pocket.

120. Being at raise pistol to remove the magazine:

Without deranging the position of the hand, rotate the pistol so that the sights move to the right, the barrel pointing to the left front and upward; press the magazine catch with the right thumb and remove the magazine with the left hand.

121. To charge the magazine: Hold the magazine in the left hand, open end up, rounded side to the right. Take the cartridge in the right hand, thumb on the rim, bullet end pointing

to the right; place the rim on the end of the magazine follower; force down the magazine spring and slip the cartridge to the left into the magazine. The next cartridge is similarly slipped in by placing it on the cartridge just inserted and forcing down the spring.

The magazine may be charged with any number of cartridges from one to seven.

122. The pistol being in the position for removing the magazine, to insert the magazine:

With the left hand insert the magazine in the handle and shove it home, not by striking it, but with a quick continuous movement, making sure that it engages with the magazine catch. Resume raise pistol.

123. Being at raise pistol with at least one cartridge in the magazine: LOAD.

Rotate the pistol as in inspection pistol. With the thumb and forefinger of the left hand grasp the slide, and by pulling it toward the body until fully back and then quickly releasing it, cause a cartridge to enter the chamber of the barrel. If the pistol is to be kept in the hand and not fired at once, the safety lock is moved to the locking position with the right thumb. If the loaded piston is to be carried in the holster the hammer must be fully lowered. Resume raise pistol.

124. The pistol being loaded, to lower the hammer:

The pistol being in the position for loading, place the left hand around the grip over the right, seat the left thumb firmly on the hammer, and insert the right forefinger inside the trigger guard. Exert sufficient pressure with the left thumb to control the movement of the hammer, press the trigger and the grip safely with the right hand, and carefully and slowly lower the hammer completely down. Remove the forefinger from the trigger.

To again cock the pistol, move the forefinger clear of the trigger, place the right thumb on the hammer, and bring the hammer back to the position of full cock.

125. To unload: UNLOAD.

Remove the magazine. Execute the motions of load, thereby throwing the cartridges from the chamber.

126. Being at raise pistol, to fire: With the right thumb release the safety lock, if in the locking position; extend the arm, bring the sights on the target, and press the trigger.

The energy of recoil causes the mechanism of the pistol to eject the empty cartridge case, load, and prepare the pistol for the next shot. Pressure must be entirely relieved from the trigger after each shot in order that the trigger may reengage the sear. At the firing of the last cartridge, as the slide moves to the rear, it is automatically locked in the open position by the slide stop, thus calling attention to the fact that the magazine is empty.

127. To reload after firing out a magazine: Remove the empty magazine, insert a charged one, and release the slide stop with the left hand.

128. To exercise the squad in collective firing, either actual or simulated: 1. At (such an object), 2. Ready, 3. Squad, 4. FIRE

At the command ready, the pistols are cocked or the safety latches are released. At the command fire, each man aims and fires by steadily increasing the pressure of his grip. It is important that no attempt be made to pull the trigger.

129. Instruction in firing will conform to the regulations prescribed in the "Small Arms Firing Manual."

Section 7. School of the Squad.

95. The squad normally consists of a corporal and seven privates.

After the recruits are permanently assigned, each squad assembles as prescribed in The Battery Dismounted.

For the instruction of recruits the men form in squads of eight in double rank (144). For instruction of a part of the battery dismounted the men may similarly be formed as squads without regard to their permanent assignment.

96. The squad executes the halt, rests, facings, steps, and marchings as explained in the "Recruit."

TO FORM THE SQUAD.

97. To form the squad the instructor places himself 3 yards in front of and facing the point where the center is to be and

commands: **FALL IN.** The men assemble (70) at double time at attention (68). The rear rank forms with a distance of 40 inches. The instructor then commands: **COUNT OFF.**

At this command all except the right file execute **eyes right**, and beginning on the right the files count **one, two, three, four**; each man turns his head and eyes to the front as he counts.

ALIGNMENTS.

98. To align the squad, the base file or files having been established: 1. **Right (Left)**, 2. **DRESS**, 3. **FRONT.**

At the command **dress** all men place the left hand upon the hip, whether dressing to the right or left; each man except the base file, when on or near the new line executes **eyes right**, and, taking steps of 2 or 3 inches, places himself so that his right arm rests lightly against the elbow of the man on his right, and so that his eyes and shoulders are in line with those of the men on his right; the rear-rank men cover in file.

The instructor verifies the alignment of both ranks from the right flank and orders up or back such men as may be in rear, or in advance, of the line; only the men designated move.

At the command **front**, given when the ranks are aligned, each man turns his head and eyes to the front and drops his left hand by his side.

In the first drills the basis of the alignment is established on, or parallel to, the front of the squad; afterwards, in oblique directions.

Whenever the position of the base file or files necessitates a considerable movement by the squad, such movement will be executed by each file marching to the front or oblique, to the flank or backward, as the case may be, without other command.

99. To preserve the alignment when marching: **GUIDE RIGHT (LEFT).**

The men preserve their intervals from the side of the guide, yielding to pressure from that side and resisting pressure from the opposite direction; they recover intervals, if lost, by gradually opening out or closing in; they recover alignment by slightly lengthening or shortening the step; the rear-rank men cover their file leaders at 40 inches.

TO TAKE INTERVALS AND DISTANCES; TO ASSEMBLE.

100. Being in line at a halt: 1. Take interval, 2. To the right (left), 3. **MARCH**, 4. Squad, 5. **HALT**.

At the second command the rear-rank men march backward 4 steps and halt; at the command **MARCH** all face to the right and the leading man of each rank steps off; the other men step off in succession, each following the preceding man at 4 paces, rear-rank men marching abreast of their file leaders.

At the command **halt**, given when all have their intervals, all halt and face to the front.

101. In taking intervals file closers, at the second command, take a distance of 4 paces from the rear rank and, at the command **march**, face to the flank, each stepping off with the file nearest him.

102. Being at intervals, to assemble the squad: 1. **Assemble**, 2. **to the right (left)**, 3. **MARCH**.

The front-rank man on the right stands fast, the rear-rank man on the right closes to 40 inches. The other men face to the right, close by the shorest line, and face to the front.

103. Being in line at a halt: 1. Take distance, 2. **MARCH**, 3. Squad, 4. **HALT**.

At the command **march** the man on the right of the front rank moves straight to the front; the other men of the front rank in order from right to left, and then those of the rear rank, in the same order, move straight to the front, each stepping off so as to follow the preceding man at 4 paces. The command **halt** is given when all have their distances.

In case more than one squad is in line, each squad executes the movement. The guide of each rank is right.

If it is desired that a less distance than 4 paces be taken the distance desired may be indicated in the preparatory command. For example: 1. Take 3 paces distance.

104. Being at distances, the men of each squad may be caused to cover the man on the right of its front rank by the command **cover**.

105. Being at distances, the instructor may command: 1. **Right (Left)**, 2. **FACE**, 3. **COVER**. The men face in the direction indicated and cover in file.

Before assembling from the resulting formation the instructor commands: 1. **Left (Right)**, 2. **FACE**.

106. Being at distances, to assemble: 1. **Assemble**, 2. **MARCH**.

The man originally on the right of the front rank stands fast; the others move forward to their positions in line.

If more than one squad is at distances, each squad executes the movement.

To assemble to the rear: 1. **About**, 2. **FACE**, 3. **Assemble**, 4. **MARCH**.

Executed as above, except that the man originally on the left of the rear rank stands fast.

107. In assembling file closers conform to the movement and resume their positions in line.

THE OBLIQUE MARCH.

108. For the instruction of recruits, the squad being in column or correctly aligned, the instructor causes the squad to face half right or half left, points out to the men their relative positions, and explains that these are to be maintained in the oblique march.

109. 1. **Right (Left) oblique**, 2. **MARCH**.

Each man steps off in a direction 45° to the right of his original front. He preserves his relative position, keeping his shoulders parallel to those of the guide (61) and so regulates his steps that the ranks remain parallel to their original front.

At the command **halt** the men halt faced to the original front.

Marching at the oblique, to resume the original direction: 1. **Forward**, 2. **MARCH**.

The men half face to the left in marching and then move straight to the front.

If at half step or mark time while obliquing, the oblique march is resumed by the commands: 1. **Oblique**, 2. **MARCH**.

TO TURN ON MOVING PIVOT.

110. Being in line: 1. **Right (Left) turn**, 2. **MARCH**.

The movement is executed by each rank successively and on the same ground. At the second command the right-flank man

of the front rank faces to the right in marching and takes the half step; the other men of the rank oblique to the right until opposite their places in line, then execute a second right oblique and take the half step on arriving abreast of the pivot man. All glance toward the marching flank while at half step and take the full step without command as the last man arrives on the line.

Right (Left) half turn is executed in a similar manner. The pivot man makes a half change of direction to the right and the other men make quarter changes in obliquing.

TO TURN ON FIXED PIVOT.

111. Being in line, to turn and march: 1. Squad right (left), 2. **MARCH**.

At the second command the right-flank man in the front rank faces to the right in marching and marks time; the other front-rank men oblique to the right, place themselves abreast of the pivot, and mark time. In the rear rank the third man from the right, followed in column by the second and first, moves straight to the front until in rear of his front-rank man, when all face to the right in marching and mark time; the other number of the rear rank moves straight to the front 4 paces and places himself abreast of the man on his right. Men on the new line glance toward the marching flank while marking time and, as the last man arrives on the line, both ranks execute forward march, without command.

112. Being in line, to turn and halt: 1. Squad right (left), 2. **MARCH**, 3. Squad, 4. **HALT**.

The third command is given immediately after the second. The turn is executed as prescribed in the preceding paragraph, except that all men on arriving on the new line mark time until the fourth command is given, when all halt. The fourth command should be given as the last man arrives on the line.

113. Being in line, to turn about and march: 1. Squad right (left) about, 2. **MARCH**.

At the second command the front rank twice executes squad right, commencing the second squad right when the man on the marching flank has arrived abreast of the rank. In the rear rank the third man from the right, followed by the second and

first in column, moves straight to the front until on the prolongation of the line to be occupied by the rear rank; changes direction to the right; moves in the new direction until in rear of his front-rank man, when all face to the right in marching, mark time, and glance toward the marching flank. The fourth man marches on the left of the third to his new position; as he arrives on the line, both ranks execute **forward, march**, without command.

114. Being in line, to turn about and halt: 1. **Squad right (left) about**, 2. **MARCH**, 3. **Squad**, 4. **HALT**.

The third command is given immediately after the second. The turn is executed as prescribed in the preceding paragraph, except that all men on arriving on the new line mark time until the fourth command is given, when all halt. The fourth command should be given as the last man arrives on the line.

Section 8. The Battery Dismounted.

GENERAL PRINCIPLES AND ORGANIZATION.

131. The instruction prescribed for the battery dismounted is applicable, with obvious modifications, to the instruction of any number of platoons, sections, or squads dismounted.

132. For technical, tactical, and administrative purposes the enlisted personnel of the battery is assigned to sections. A section dismounted consists of one sergeant, who is chief of section, and all the men assigned to the service of a piece and its caisson, called a **gun section**; or to the service of two caissons, called a **caisson section**. The leading caisson of a caisson section is the **first caisson**; the rear caisson, the **second caisson**. The section assigned to the service of the battery wagon and the store wagon and to the service of the tools carried in those wagons is called the **ninth section**. The section assigned to the service of supply is called the **supply section**. At dismounted formations the members of the supply section, unless assigned elsewhere, habitually form in the line of file closers of the ninth section.

133. The first four sections of the battery are **gun sections**. The remaining sections, except the ninth section and the supply section, are **caisson sections**. Each gun section consists of a

gun squad and a driver squad. Each caisson section consists of a caisson squad and a driver squad. The ninth section consists of a mechanic squad and a driver squad.

134. Each section dismounted is formed in line, with the gun squad, caisson squad, or mechanic squad on the right, the driver squad on the left. Men temporarily attached to sections fall in in the line of file closers or at such other places as may be designated.

135. Each gun squad consists of one of the corporals and seven of the privates assigned to the service of a gun section. The corporal is the gunner and should be selected for his qualifications without regard to his rank in the section. The privates are **cannoneers**, numbered from No. 1 to No. 7.

136. Each caisson squad consists of one of the corporals and seven of the privates assigned to the service of a caisson section. The corporal is a caisson corporal. The privates are **cannoneers**, three of whom are assigned to the first caisson and numbered from No. 4 to No. 6, and the remaining four to the second caisson and numbered from No. 4 to No. 7.

Movements prescribed for a gun squad apply, with obvious modifications, to a caisson, driver, or mechanic squad.

137. Each driver squad of the gun and caisson sections consists of a caisson corporal, the six drivers of the carriages of the section, and an extra **cannoneer**, No. 8, who is trained as a spare driver.

138. Each gun squad is formed in double rank as follows: The gunner and Nos. 2, 4, and 6 in the front rank in order from right to left; Nos. 1, 3, 5, and 7 in the rear rank, in order from right to left; No. 1 covering the gunner.

6	4	2	G
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40 inches.

7	5	3	1
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139. Each caisson squad is formed in double rank as follows: The caisson corporal and Nos. 4, 5, and 6 of the first caisson in the front rank in order from right to left; Nos. 4, 5, 6, and 7 of the second caisson in the rear rank, in order from right to left; No. 4 covering the caisson corporal.

6	5	4	CO
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40 inches.

7	6	5	4
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140. Each driver squad is formed in double rank as follows: The caisson corporal is on the right of the front rank; the lead, swing, and wheel drivers of the piece in a gun section, or of the first caisson in a caisson section, are on the left of the caisson corporal in order from right to left; the lead, swing, and wheel drivers of the caisson in a gun section, or of the second caisson in a caisson section, are in the rear rank in order from right to left covering the drivers of the front rank; the spare driver, No. 8, is in the rear rank covering the caisson corporal.

W	S	L	CO
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40 inches.

W	S	L	8
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The driver squad of the ninth section is similarly formed, the spare lead and spare wheel drivers taking, respectively, the places prescribed for the caisson corporal and No. 8.

141. In the fifth section the driver squad is formed with the telephone corporal of the battery commander's detail as its corporal; the scout corporals and the signal privates of that detail fall in as file closers of the section.

142. The mechanic squad is formed in double rank as follows: In the front rank the chief mechanic is on the right and three of the mechanics are on his left; in the rear rank, covering the men in the front rank, are the four remaining mechanics.

143. In a battery on a peace footing the spare cannoneers assigned to the ninth section constitute a squad, which forms on the left of the driver squad.

144. At dismounted formations, if a squad contains less than six men, it is increased to that number by transfers from other squads, or is broken up and its members assigned to other squads and posted in the line of file closers.

When a squad consists of six men, both of the interior files are blank; when of seven men, one such file is blank.

145. A platoon dismounted consists of one lieutenant, who is chief of platoon, and two sections dismounted.

The platoon dismounted is formed in double rank, with the sections arranged from right to left in the order of their permanent numbers.

146. A battery dismounted comprises the personnel shown in detail in Tables of Organization I and II.

147. The battery dismounted is formed in double rank with the platoons arranged from right to left in the order of their permanent numbers.

The senior lieutenant is, at formations and exercises of the battery dismounted, assigned as chief of the first platoon. The lieutenant next in rank is assigned as chief of the second platoon, and so on.

Chiefs of platoon and section supervise the movements of their units.

148. When only a part of the battery is formed for dismounted instruction, the word **section** or **platoon**, as the case may be, is substituted in the commands for **battery**.

POSTS OF OFFICERS, NONCOMMISSIONED OFFICERS, ETC.**IN LINE.**

149. The captain: Four yards in front of the center of the battery.

Chiefs of platoon: Two yards in front of the center of their platoons.

The fourth lieutenant, when there are but three platoons: In the line of file closers, opposite the center of the battery.

The first sergeant: In the front rank, 1 yard from the right of the first section.

The quartermaster sergeant: In the front rank, 1 yard from the left of the left section.

The mess and stable sergeants: In the line of file closers of the ninth section.

Chiefs of section: One yard in front of the center of their sections.

Corporals: The right man of the front rank of their squads, except the scout corporals, who are in the line of file closers of the fifth section.

The guidon and the musicians: In the line of file closers of the first section.

Other men for whom there is no place in the squads: In the line of file closers in rear of the section to which they belong or are attached.

IN COLUMN OF SQUADS.

150. The captain: Four yards from the flank, opposite the center, on the left (right) when the first (ninth) section is in front.

Chiefs of platoon: On the same side as the captain, 2 yards from the flank and opposite the center of their platoons.

The fourth lieutenant, when there are but three platoons: On the side opposite the captain, 2 yards from the flank and opposite the center of the column.

The first sergeant: Either 40 inches in front of the guiding file of the leading squad or 40 inches in rear of the guiding file of the rear squad, according as the column has been formed by executing squads right or squads left from line.

The quartermaster sergeant: Either 40 inches in rear of the guiding file of the rear squad or 40 inches in front of the guiding file of the leading squad, according as the column has been formed by executing squads right or squads left from line.

Chiefs of section: On the same side as the captain and 4 inches from the flank man of the front rank of the rear squad of their section.

The file closers: On the side opposite the captain and abreast of and 4 inches from the flank of the squad in rear of which they are posted in line.

TO FORM AND TO DISMISS THE BATTERY.

151. At the sounding of the assembly, the first sergeant, facing the battery and 6 yards in front of where the center is to be, commands: 1. **FALL IN**, 2. **CALL ROLLS**, 3. **REPORT**.

At the command **fall in**, the gunners, caisson corporals, telephone corporal, and chief mechanic place themselves on the line facing to the front in their proper order, at sufficient distance apart for the formation of their squads; each squad forms on its corporal; the chiefs of section take their posts facing their sections. The assembly having ceased, the first sergeant causes the sections to close to the right, if necessary.

At the command **call rolls**, the chiefs of section call the rolls and then face to the front.

At the command **REPORT**, the chief of the first section salutes and reports: **First section, present**; or **First section, Corporal — and Private(s) — are absent**. The first sergeant, having received and verified this report, returns the salute. The chief of the second section then reports in like manner, and so on. Men who are known to be absent by proper authority are not reported absent by the chiefs of section. After receiving the reports, the first sergeant faces about, salutes the captain, and reports: **Sir, the battery is present or accounted for**; or, **Sir (as many), noncommissioned officers or privates are absent**. The first sergeant then takes his post.

The captain places himself 12 yards in front of the center of the battery, superintends the formation, and receives the report of the first sergeant, whose salute he returns.

The lieutenants take their posts as soon as the first sergeant has reported.

During instruction the officers have the saber drawn or in the scabbard, at the discretion of the captain. When the captain draws saber, the lieutenants also draw saber.

TO OPEN RANKS.

152. Being in line at a halt: 1. Open ranks, 2. MARCH, 3. FRONT.

At the command **march** the front rank executes **right dress**; the rear rank and the file closers march backward four steps, halt, and execute **right dress**; the fourth lieutenant, when only three platoons are present, marches backward 4 steps and halts; the chiefs of platoon step forward 2 yards, the chiefs of section 1 yard, and all dress to the right. The captain goes to the right flank of the battery and aligns the chiefs of platoons, the chiefs of section, the front rank, the rear rank, and the file closers.

Before giving the command **front** the captain places himself in front of the post of the first sergeant and on a line with the chiefs of platoon and faces to the left. At the command **front** all the men turn their heads and eyes to the front, and those in ranks drop the left arm.

After the command **front** has been executed, the captain places himself 6 yards in front of the center of the battery, facing to the front.

TO CLOSE RANKS.

153. Being at open ranks: 1. Close ranks, 2. MARCH.

At the command **march**, the lieutenants and chiefs of section face about and resume their posts in line; the rear rank closes to 40 inches, each man covering his file leader; the file closers close to 2 yards from the rear rank; the captain then takes his post in line.

ALIGNMENTS.

154. The alignments are executed as prescribed for the squad; the base squad may, if desired, be established instead of the base file. In aligning the battery, the captain places him-

self in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made; after commanding front, he resumes his post.

TO DISMISS THE BATTERY.

155. Being in line at a halt:

The captain directs the first sergeant: Dismiss the battery, and returns the salute of the first sergeant.

The officers fall out; the first sergeant salutes, steps 3 yards to the front, faces to the left, and commands: **DISMISSED.**

In exceptional cases the battery may be dismissed from any formation, either at a halt or marching.

MANEUVERS OF THE BATTERY.

GENERAL PROVISIONS.

156. The maneuvers of the battery dismounted are limited to those necessary for its orderly handling. They are also valuable for fixing the attention of the men and for teaching habits of discipline and prompt obedience.

157. The instruction set forth in detail for the soldier dismounted is applicable to the battery dismounted, the facing, steps, marchings, turnings, rests, all being executed according to the same principles, officers, noncommissioned officers, and file closers conforming to the movements.

158. In marching in line the guide is the right or left man of the front rank (60). In marching in column of squads the guide is the first sergeant or quartermaster sergeant if in ranks; otherwise the guide of the leading squad.

If the guide is changed while marching in column of squads, the captain, chiefs of platoon, chiefs of section, and file closers change to the other flank by darting through the column or passing around the ends of the column, as may be most convenient.

159. When line is formed from column of squads, the captain, chiefs of platoon and of section, file closers, the first sergeant, and the quartermaster sergeant take their posts in line in

the most convenient way without interfering with the movements of the squads.

160. Whenever the battery in line is faced about or marched to the rear, all men in the front rank, not covered, step into the new front rank; the first sergeant and the quartermaster sergeant place themselves in line with the new front rank, but do not change to the opposite flank. The chiefs of platoon and section and the file closers maintain their relative positions.

TO FORM OR MARCH IN COLUMN OF SQUADS FROM LINE.

161. Being in line: 1. Squads right (left), 2. **MARCH**; or 1. Squads right (left), 2. **MARCH**, 3. Battery, 4. **HALT**.

Each squad executes the movement (111). The chiefs of platoon and of section and the file closers take their places in column of squads (150).

The guide of each rank preserves the trace and step of the preceding guide at a distance of 40 inches.

TO CHANGE DIRECTION WHILE IN COLUMN OF SQUADS.

162. Being in column of squads, to change direction: 1. Column right (left), 2. **MARCH**.

At the second command the front rank of the leading squad turns to the right on a moving pivot (110); the other ranks, without command, turn successively on the same ground and in a similar manner.

Column half right (half left) is similarly executed.

TO FORM COLUMN OF SQUADS FROM LINE AND CHANGE DIRECTION.

163. Being in line: 1. Squads right (left), column right (left), 2. **MARCH**; or, 1. Right (Left) by squads, 2. **MARCH**.

In the first case the right squad initiates the column right as soon as it has completed the squad right.

In the second case, at the command march, the right squad marches forward; the remainder of the battery executes squads right (161), column left (162) on the same ground as the right squad, and follows the right squad. The right squad in moving off takes four short steps and then the full step.

TO FORM LINE FROM COLUMN OF SQUADS.

164. Being in column of squads, to form line to the flank: 1. Squads right (left), 2. **MARCH**, 3. Guide right (left); or, 1. Squads right (left), 2. **MARCH**, 3. Battery, 4. **HALT**.

Executed by each squad (112). The chiefs of platoon and section, file closers, etc., take their posts in line (149) in the most convenient manner.

165. Being in column of squads, to form line on right or left: 1. On right (left) into line, 2. **MARCH**, 3. Battery, 4. **HALT**, 5. **FRONT**.

At the first command the corporal of the leading squad commands: **Right turn**. The corporals of the other squads command: **Forward**, if at a halt. At the second command the leading squad turns to the right on moving pivot. The command halt is given when the leading squad has advanced the desired distance in the new direction; it halts; its corporal then commands: **Right (left) dress**.

The squads in rear continue to march straight to the front; each, when opposite the right of its place in line on the left of the preceding squads, executes right turn at the command of its corporal; each is halted on the line at the command of its corporal, who then commands: **Right dress**. All dress on the first squad in line.

If executed in double time, all the squads march in double time until halted.

166. Being in column of squads to form line to the front: 1. Right (left) front into line, 2. **MARCH**, 3. Battery, 4. **HALT**, 5. **FRONT**.

At the first command the corporals of the squads in rear of the leading one command: **Right oblique**. If at a halt, the corporal of the leading squad commands: **Forward**. At the second command the leading squad moves straight forward; the rear squads oblique as indicated. The command halt is given when the leading squad has advanced the desired distance; it halts; its corporal then commands: **Left dress**. Each of the rear squads when opposite its place in line resumes the original direction at the command of its corporal; each is halted on the

line at the command of its corporal, who then commands: **Left dress.** All dress on the first squad in line.

If executed in double time, all the squads march in double time until halted.

TO FORM FLANK COLUMN OF FILES FROM LINE.

167. Movements in flank column have no disciplinary value. Their use should be limited to the rare occasions necessitating a narrow front of the column. They are executed in quick time only.

168. Being in line at a halt: 1. **Right (left)**, 2. **FACE**, 3. **Forward**, 4. **MARCH**.

At the second command all face to the right. At the fourth command all take the full step. Individuals not in the two ranks move so as to preserve the relative positions they had in line.

ROUTE ORDER AND AT EASE.

169. Marching in column of squads: 1. **Route order**, 2. **MARCH**; or, 1. **At ease**, 2. **MARCH**.

Officers carry their sabers at will or in the scabbard; the men retain their positions in ranks, but are not required to keep step.

If the command be **route order**, the men are permitted to talk; if the command be **at ease**, silence is preserved.

To resume the cadenced step: 1. **Battery**, 2. **ATTENTION**.

If the command **halt** be given while marching at route order, the men remain at rest in ranks; if while marching at ease, they remain at ease.

Route order and at ease are not used while marching in double time.

The use of dismounted exercises being limited, the marching of the battery dismounted at route order or at ease should be exceptional.

Section 9. Preliminary Exercises of the Gun Squads.**FORMATION OF THE GUN SQUADS.****TO FORM THE GUN SQUADS.**

170. The instructor indicates the place of formation and commands: **FALL IN.**

Each gunner repeats the command and hastens to place himself, faced to the front, where the right of his squad is to rest. The cannoneers move at double time and take their places.

171. The place of formation is indicated and the command given thus, for example: 1. In front (rear) of your pieces (caissons); or, 1. On the right (left) of your pieces (caissons) facing them; or, 1. On the road facing the park, 2. **FALL IN.**

172. In case the front or rear of the carriages is designated, each squad falls in at its post (175-177).

173. For the first formation of the gun squads for any drill or exercise, the instructor cautions as gun squads before giving the command.

TO TELL OFF THE SQUADS.

174. **CALL OFF.** In each gun squad (138) the cannoneer on the right of the rear rank calls off one; the cannoneer on the left of the gunner, two; the cannoneer on the left of No. 1, three; and so on. The gunner does not call off.

In each caisson squad (139) the cannoneers of the front rank call off first, thus: four, five, six, in order from right to left, followed by the cannoneers of the rear rank in the same order. The caisson corporal does not call off.

After having called off, if a subsequent formation is ordered, the cannoneers fall in at once in their proper order.

POSTS OF GUN SQUADS AND CANNONEERS; MOUNTING AND DISMOUNTING.**POSTS OF THE GUN SQUADS, CARRIAGES LIMBERED.**

175. In front of the pieces or caissons: Each squad is in line facing to the front, its rear and center 2 yards from the end of the pole or from the heads of the lead horses.

176. In rear of the pieces or caissons: Each squad is in line facing to the front, its front and center 2 yards from the muzzle or from the rear of the caisson.

177. If no special place of formation is designated, each squad, when formed at the carriages, is posted in front of the leading carriage of its section.

TO POST THE GUN SQUADS.

178. The squads are marched to the park, and, on arrival near the carriages, the instructor commands: Squads in front (rear) of your pieces (caissons).

Each gunner marches his squad to its carriage and posts it in the indicated position.

179. The instructor habitually causes the squads to approach the front (rear) of the carriages which he designates in his command, from the right of the park if left in front and from the left if right in front.

POSTS OF THE CANNONEERS, CARRIAGES LIMBERED.

180. The gunner and No. 1 opposite the rear of the limber wheels of the piece.

Nos. 2 and 3 opposite the rear of the gun wheels.

Nos. 4 and 5 opposite the rear of the caisson wheels.

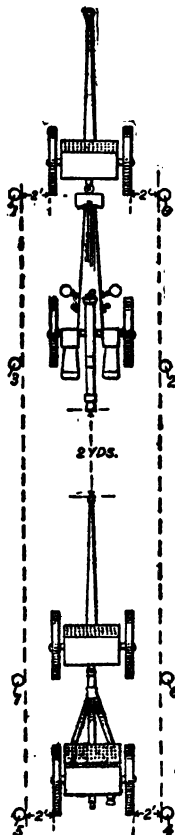
Nos. 6 and 7 opposite the rear of the limber wheels of the caisson.

The gunner and even numbers are on the right, the odd numbers on the left, all 2 feet outside the wheels, facing the front.

TO POST THE CANNONEERS.

181. 1. Cannoneers, 2. POSTS. Each gunner repeats the command *posts*. The cannoneers leave the ranks, if formed, and move at double time by the shortest practicable routes to their posts.

182. For preliminary instruction the squads, on entering the park, are first posted with their carriages; the cannoneers are then sent to their posts by the foregoing command. The com-



Command is general, however, and is applicable when the cannonneers are in or out of ranks, at a halt or marching, and when the carriages are limbered or unlimbered.

TO MOUNT THE CANNONEERS ON THE CARRIAGES LIMBERED.

183. In each squad the gunner and No. 1 mount on the limber chest of the piece.

Nos. 2 and 3 mount on the axle seats.

Nos. 4 and 5 mount on the caisson chest.

Nos. 6 and 7 mount on the limber chest of the caisson.

When extra cannonneers are present:

No. 8 mounts between Nos. 6 and 7.

No. 9 mounts between Nos. 4 and 5.

The gunner and even numbers mount on the right side of their respective carriages, odd numbers on the left.

184. 1. Cannonneers, prepare to mount.
2. MOUNT.

At the first command the cannonneers who mount on the limber chests or axle seats hasten to the rear of the limber chests or axle seats; those who mount on the caisson chest hasten to the front of that chest. Each cannonneer who mounts on the limber chest places the foot nearest the wheel on the step, grasps the chest handle with the hand nearest the wheel, and with the other hand grasps the hand of the cannonneer opposite him. Each cannonneer who mounts on the caisson chest places the foot nearest the wheel on the step, and grasps the chest handle with the hand nearest the wheel. Cannonneers who mount on the axle seats place the foot nearest the wheel on the brake beam, and grasp the seat handle with the hand nearest the wheel.

At the command mount, all spring up and seat themselves, those on the chests facing to the front, those on the axle seats to the rear. Those who mount on the limber chests place the foot farthest from the wheel on the top of the limber chest, and then step down on the footboard.

185. If the command be: 1. Cannoneers, 2. MOUNT, the cannoneers execute, at the command mount, all that has been prescribed for the commands prepare to mount and mount.

TO DISMOUNT THE CANNONEERS FROM THE CARRIAGES.

186. 1. Cannoneers, prepare to dismount, 2. DISMOUNT.

The cannoneers on the chests stand up on the footboards at the first command; at the second command all the cannoneers jump to the ground and take their posts at the double time.

187. If the command be: 1. Cannoneers, 2. DISMOUNT, they execute, at the command dismount, all that has been prescribed for the commands prepare to dismount and dismount.

POSTS OF THE CANNONEERS, CARRIAGES UNLIMBERED BUT NOT PREPARED FOR ACTION.

188. In each squad the gunner immediately in rear of the cannoneer's seat, on the left side of the trail of the gun.

No. 1, immediately in rear of the cannoneer's seat, on the right side of the trail of the gun.

No. 2, 2 feet in rear of the gunner, covering him.

Nos. 3, 4, and 5, 2 feet in rear of the caisson chest in the order named from right to left.

Nos. 6 and 7, abreast and in order from right to left, 5 yards in rear of the trail spade.

Higher-numbered cannoneers, if present, accompany the limbers. The cannoneers stand at attention at their posts, facing to the front.

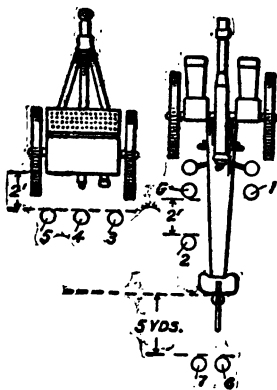


PLATE 41, Par. 188.

TO CHANGE THE POSTS AT THE CANNONEERS.

189. In order to exercise the cannoneers in all duties connected with the service of the piece, to vary the drill, and to fix the attention of the men the posts of the cannoneers are frequently changed.

190. The cannoneers being at their posts, carriages limbered or unlimbered: 1. Change posts, 2. MARCH.

In each squad No. 1 quickly takes the post of No. 2, No. 2 of No. 3, No. 3 of No. 4, No. 4 of No. 5, No. 5 of No. 1. Higher-numbered cannoneers change only when specially directed,

MOVEMENTS OF THE CARRIAGES BY HAND.

TO MOVE BY HAND THE CARRIAGES LIMBERED.

191. To the front: 1. Pieces (Caissons) forward, 2. MARCH, 3. HALT. In each squad, at the first command, the gunner and No. 1 hasten to the end of the pole; Nos. 2 and 3 to the limber wheels; Nos. 4 and 5 to the rear wheels; higher-numbered cannoneers to the rear of the carriage; the gunner and even numbers working on the right side of the carriage, odd numbers on the left. The cannoneers who work at the pole or at the wheels grasp the same with both hands; those in rear of the carriage prepare to push against the most convenient part of the carriage.

At the command march, all assist in moving the carriage to the front. At the command halt, the carriage is stopped, the pole is lowered to the ground, and all resume their posts.

192. To the rear: 1. Pieces (Caissons) backward, 2. MARCH, 3. HALT. Executed as in the preceding paragraph, except that at the command march the cannoneers move the carriage to the rear and that the higher-numbered cannoneers place themselves in front of the rear axle of the carriage and push against the most convenient part of the carriage.

DUTIES OF THE CANNONEERS IN UNLIMBERING.

DISPOSITION OF THE CARRIAGES BEFORE AND AFTER UNLIMBERING.

193. Before unlimbering: The piece and its caisson are placed abreast of each other, 2 yards apart, poles pointing in the same

direction. This formation of the carriages is called a double section. The interval of 2 yards should not be materially changed, otherwise the amount of movement of the carriages by hand is greatly increased.

194. If it is intended to fire to the front, the caissons should be placed on the left of their pieces before the command for unlimbering is given; if it is intended to fire to the rear, the caissons should be on the right of their pieces; if to the flank, on either side of their pieces. In emergencies the carriages may be unlimbered from any formation. Dispositions to meet various situations should be practiced.

195. When not horsed the carriages are drawn by the cannoneers and the instructor gives the necessary instructions for moving the carriages by the shortest routes into the prescribed positions.

196. After unlimbering: The adjacent wheels of the gun and caisson are about 1 foot apart, the gun muzzle and the caisson trail pointing to the front, the gun on the right and slightly in advance of the caisson.

The gun is placed slightly in advance to allow for recoil at the first shot, which on ordinary ground is about 10 inches.

The interval of 1 foot may be increased to permit wide movements of the trail if they are anticipated, but effort should be made to preserve the protection afforded by the shields.

In emergencies the caissons may be placed temporarily on the right of their pieces. As this position is not favorable to the service of ammunition, the caissons should be placed on the left of their pieces as soon as practicable.

197. In active service and in instruction simulating service conditions, the limbers are placed under cover in the vicinity of the position; if no cover is obtainable in the vicinity, they are placed in line in rear of either flank at such place as the instructor may designate.

TO UNLIMBER—GENERAL RULES.

198. 1. In unlimbering to fire to the front each caisson establishes the position.

2. In unlimbering to fire to the rear, each piece establishes the position.

3. In unlimbering to fire to the flank, the element (gun or caisson) on the side toward which fire is to be directed establishes the position.

4. If the carriages, after unlimbering, have to be moved by hand to the firing position, all the cannoneers of the gun squad, when the ground is difficult, assist at each carriage in turn in moving it to the designated position.

5. In drills with the carriages not horsed, spare cannoneers or those higher in number than No. 5 are used to move the limbers to the place designated by the instructor.

6. If the carriages are not horsed, they are unlimbered successively, the one which establishes the position being unlimbered first. The limbers are drawn by cannoneers designated by the instructor. Thus, if only the gunner and five cannoneers are present, the cannoneers posted with the piece may be required to move the limber of the caisson, and those with the caisson, the limber of the piece. If higher-numbered cannoneers are present, however, they are ordinarily used for this purpose.

TO FIRE TO THE FRONT.

199. The carriages being in double section (193) the caissons on the left: **ACTION FRONT.** If marching, the carriages halt at the command or signal. The cannoneers, if mounted, dismount after the carriages have halted.

The Caissons: Nos. 4 and 5 jump to the trail handles. Nos. 6 and 7, if present, run to the right and left caisson wheels, respectively, and stand ready to assist in such movements of the carriage as may be necessary. No. 4 unlatches the pintle; Nos. 4 and 5 raise the trail from the pintle; and No. 4, by raising his arm, signals for the drivers to drive on; Nos. 4 and 5 then lower the trail to the ground. No. 4 sets the brake, and all the cannoneers at the caisson take their posts.

The Pieces: The gunner and No. 1 jump to the trail handles. No. 2 runs around the muzzle of the gun to the wheel that is to become the right wheel of the piece unlimbered and places himself so as to be ready to turn the top of his wheel toward the trail. No. 3 runs around the muzzle of the gun to the wheel that is to become the left wheel of the piece unlimbered

and places himself so as to be ready to turn the top of his wheel toward the muzzle. The gunner unlatches the pintle, and, assisted by No. 1, raises the trail from the pintle. The gunner, by raising his arm, signals for the drivers to drive on. The gunner and No. 1 carry the trail away from the caisson and all of the cannoneers working together turn the piece around 180°. The gunner causes the piece to be placed by the side of the caisson (196). The gunner and No. 1 lower the trail to the ground, and all the cannoneers at the piece take their posts.

Limbers: At the signal drive on, the limbers take their prescribed positions (197). To take posts in rear of the carriages each caisson limber executes a left about, moves straight to the rear, executes another left about, and halts, so that the heads of the lead horses or the end of the pole will be 25 yards from the rear of the caisson. Each piece limber follows the caisson limber, passes around in rear of it, and halts so as to be abreast of it and 2 yards to its right.

In horse batteries, Nos. 6 and 7 do not assist at the caisson.

TO FIRE TO THE REAR.

200. The carriages being in double section, the caissons on the right: **ACTION REAR.** If marching, the carriages halt at the command or signal. The cannoneers, if mounted, dismount after the carriages have halted.

The Caisson: Nos. 4 and 5 jump to the trail handles. Nos. 6 and 7, if present, run to the right and left caisson wheels, respectively. No. 6 stands ready to turn the top of his wheel away from the trail, while No. 7 stands ready to turn his toward the trail. No. 4 unlatches the pintle; Nos. 4 and 5 raise the trail from the pintle and No. 4, by raising his arm, signals for the drivers to drive on; Nos. 4 and 5 carry the trail away from the piece and all the cannoneers working together turn the caisson around 180° and place it by the side of the piece (196); Nos. 4 and 5 lower the trail to the ground. No. 4 sets the brake and all of the cannoneers working on the caisson take their posts.

The Piece: The gunner and No. 1 jump to the trail handles. No. 2 runs around the muzzle of the gun to the wheel that is to

become the right wheel of the piece unlimbered, and stands ready to assist in such movements of the carriage as may be necessary. No. 3 runs around the muzzle of the gun to the wheel that is to become the left wheel of the piece unlimbered, and stands ready to assist in such movements of the carriage as may be necessary. The gunner unlatches the pintle and, assisted by No. 1, raises the trail from the pintle. The gunner, by raising his arm, signals for the drivers to drive on. The gunner and No. 1 lower the trail to the ground and all the cannoneers at the piece take their posts.

Limbers: To take post in rear of the carriages, each caisson limber inclines well to the right, moves to the rear, executes a left about, and halts so that the heads of the lead horses or the end of the pole will be 25 yards from the rear of the caisson. Each piece limber follows the caisson limber, passes around in rear of it, and halts so as to be abreast of it and 2 yards to its right.

In horse batteries, or when Nos. 6 and 7 are not present, Nos. 2 and 3 perform the duties prescribed for Nos. 6 and 7, respectively, as soon as the piece trail is lowered to the ground.

TO FIRE TO THE FLANK.

201. The caisson being on either side of the piece, 2 yards from and abreast of it: **ACTION RIGHT (LEFT).**

Executed according to the principles of action front and action rear, with the following modifications: After the carriages are unlimbered the muzzle of the gun and the trail of the caisson are turned in the direction of fire, and the carriage in rear is run up to its proper position on the line. The carriage on the side toward which fire is to be delivered is first established in position, and then all the cannoneers assist in bringing up the carriage in rear to its proper place.

Limbers: To take post in rear of their carriages, the limber farthest from the flank toward which fire is to be delivered moves out first, wheel away from the direction of fire, and after having gained sufficient distance to the rear execute an about and halt at the prescribed position. The other limbers follow and take position in a similar manner.

DUTIES OF THE CANNONEERS IN LIMBERING.

202. The carriages being in position unlimbered and in march order, to limber to the front and rear: 1. Limber, 2. **FRONT AND REAR.**

In each squad the gunner and No. 1 face to the rear at their posts. No. 2 places himself on the right of the gunner, facing to the rear. No. 3 jumps across the trail of the piece and places himself on the left of No. 1, facing to the rear. Nos. 4 and 5 hasten to the front of the caisson; No. 4 releases the brake, and both place themselves with their backs toward the chest, close up against the footboards, No. 4 on the right, No. 5 on the left of the trail. No. 6 passes around the right of the piece and places himself on the right of No. 4. No. 7 runs around the left of the caisson and places himself on the left of No. 5.

The limbers are brought up so as to move squarely across the direction of the trails and so that the wheel nearest the trail will pass about a foot outside of the lunette.

When the axle of the piece limber is nearly in line with the trail, the gunner commands: 1. Limber, 2. **HALT.** The limber halts and is then swung around and again halted so that the pole is pointing in the direction of the trail and so that the pintle is almost over the lunette. As soon as the limber has halted in this position, the gunner and No. 1 spring to the trail handles and raise the trail. Nos. 2 and 3 jump to the gun wheels and prepare to assist in any movements of the carriage that may be necessary. The gunner and No. 1 place the lunette over the pintle; the gunner latches the pintle.

The caisson is limbered in the same manner, No. 4 giving the commands for halting the limber; Nos. 4 and 5 handling the trail; No. 4 latching the pintle; Nos. 6 and 7 assisting by working on the wheels in any movements of the carriage.

All the cannoneers take their posts at the carriages limbered.

203. To the rear: 1. Limber, 2. **REAR.**

No. 4 releases the brake. The caisson is turned around 180°; Nos. 4 and 5 carrying the trail away from the piece. Nos. 1 and 6 turn the top of their wheel toward the trail; Nos. 3 and 7 turn the top of their wheel away from the trail; the gunner and No. 2 assist by pulling and pushing on the chest. The caisson having been turned, all the cannoneers working

together run the caisson 20 yards straight to the rear of the line of guns. Nos. 4 and 5 lower the trail and all the cannoneers take their posts for limbering. The limbers are brought up and the limbering is completed as described in paragraph 202.

TO LEAVE THE PARK.

204. At the conclusion of the instruction in the park the instructor sees that the carriages are properly cared for and then causes the squads to form in front or rear of their carriages. The squads may then be closed by the command: 1. **Squads right (left)**, 2. **MARCH**, 3. **Close**, 4. **MARCH**. At the last command the leading squad halts and the rear squads close on it in quick time and halt. If executed in double time, the leading squad resumes or continues the quick time at the last command and the other squads take the quick time when they are closed.

Or, the squads may be faced to the right or left. At the command: 1. **Close**, 2. **MARCH**, the leading squad stands fast and the others close on it.

After forming the squad column the men are marched off.

Section 10. Battery Inspection, Dismounted.

733. The battery being in line, the captain causes the ranks to be opened and commands: **Prepare for inspection (119)**. At that command the lieutenants carry saber.

734. The captain returns saber, inspects the chiefs of platoon, the front rank, the rear rank, and the file closers, beginning on the right of each and returning by the left and rear. During the inspection of the ranks the lieutenants face about and stand at ease; they may be directed to accompany the captain or to assist in the inspection. Upon the completion of the inspection the lieutenants face to the front and resume the attention; the captain closes the ranks and dismisses the battery.

735. Should the inspector be other than the captain, the latter opens ranks and, when the inspector approaches, brings the battery to attention, faces to the front, and salutes. The salute acknowledged, the captain carries saber, faces about, commands: **Prepare for inspection**, and again faces to the front.

The inspection proceeds as before; the captain returns saber and accompanies the inspector as soon as the latter has inspected him.

At inspection of quarters the inspector is accompanied by the captain and followed by the other officers, or by such of them as he may designate; the men, without accouterments, stand uncovered near their respective bunks; in camp they stand covered, without accouterments, in front of their tents; upon the approach of the inspector the first sergeant commands: **ATTENTION**, salutes, if covered, and leads the way through the quarters or camp.

Section 11. The Soldier Mounted.

PRELIMINARY INSTRUCTION.

HORSE EQUIPMENT.

225. The instructor indicates the different articles of horse equipment, instructs the men in the nomenclature of the various parts, as given in the Handbook, and explains the uses of these parts.

TO FOLD THE BLANKET.

226. The blanket, after being well shaken, will be folded into six thicknesses, as follows: Hold it well up by two adjacent corners, the longer edges vertical; double it lengthwise, so the fold will come between the "U" and "S," the folded corner in the left hand; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket extended between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds, seize the double folded corner; turn the left, disengaged corner in and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds, grasp the corners and shake the blanket well in order to smooth the

folds; raise the blanket and hold the upper edge between the chin and breast; slip the hands down halfway, the first two fingers outside, the other fingers and thumb of each hand inside; seize the blanket with the thumbs and first two fingers, let the part under the chin fall forward; hold the blanket up, arms extended, even the lower edges; retake the middle points between the thumb and forefinger and flit the outside part over the right arm; the blanket is thus held before placing it on the horse.

TO PUT ON THE BLANKET AND SURCINGLE.

227. The instructor commands: **BLANKET**. Approach the horse on the near side, with the blanket folded and held as just described; place it well forward on his back by tossing the part of the blanket over the right arm to the off side of the horse, still keeping hold of the middle points; slide the blanket once or twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward; place the blanket with the forefinger of the left hand on the withers and the forefinger of the right hand on the backbone, the blanket smooth; it should then be well forward with the edges on the left side; remove the locks of mane that may be under it; pass the buckle end of the surcingle over the middle of the blanket and buckle it on the near side, a little below the edge of the blanket.

TO SADDLE.

228. For instruction, the saddle may be placed 4 yards in rear or in front of the horse. The stirrups are crossed over the seat, the right stirrup uppermost; then the cincha and cincha strap are crossed above the stirrups, the strap uppermost. The blanket, without the surcingle, having been placed as previously explained (227), the instructor commands: **SADDLE**.

Seize the pommel of the saddle with the left hand and the cantle with the right; approach the horse on the near side from the direction of the croup and place the center of the saddle on the middle of the horse's back, the front ends of the side bars about three finger widths behind the points of the shoulder blades; let down the cincha strap and cincha; pass to the off

side, adjust the cincha and straps and see that the blanket is smooth; return to the near side, run the left hand, back up, down the withers so as to raise the blanket slightly under the pommel arch, in order that the withers may not be pinched or pressed upon; take the cincha strap in the right hand, reach under the horse and seize the cincha ring with the left hand, pass the end of the strap between the ring and safe and through the ring, then up through the upper ring from the outside; if necessary, make another fold in the same manner.

The strap is fastened as follows: Pass the end through the upper ring to the front; seize it with the left hand, place the fingers of the right hand between the outside folds of the strap; pull slowly from the horse with the right hand and take up the slack with the left; cross the strap over the folds, pass the end of it, with the right hand, underneath and through the upper ring back to the folds, then down and under the loop that crosses the folds and draw it tightly; secure the end of the strap.

Another method of fastening the cincha strap is as follows: Pass the end through the upper ring to the rear; seize it with the right hand, place the fingers of the left between the outer folds of the strap; pull slowly from the horse with the left hand and take up the slack with the right; pass the end of the strap underneath and draw it through the upper ring until a loop is formed; double the loose end of the strap and push it through the loop and draw the loop taut. The free end should then be long enough conveniently to seize with the hand.

Having fastened the cincha strap, let down the right stirrup, then the left.

The surcingle, if used, is then buckled over the saddle, and should be a little looser than the cincha.

In saddling a horse the cincha must be tightened gradually, and not with violence, a practice that if persisted in renders a horse ill tempered and mean in saddling.

TO REMOVE THE SADDLE.

229. UNSADDLE: Stand on the near side of the horse; unbuckle and remove the surcingle; cross the left stirrup over the saddle; loosen the cincha strap and let down the cincha; pass to the off side, cross the right stirrup, then the cincha over the

saddle; pass to the near side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, remove the saddle over the croup and place it in front or in the rear of the horse as may be directed, pommel to the front; if in the stable, place the saddle on its peg; grasp the blanket at the withers with the left hand and at the loin with the right; remove it in the direction of the croup, the edges falling together, wet side in, and place it across the saddle, folded edge on the pommel.

TO PUT ON THE DOUBLE BRIDLE.

231. BRIDLE: Take the double reins in the right hand, the crownpiece in the left; approach the horse on the near side; slip the reins over his head, letting them rest on his neck; take the crownpiece in the right hand and the lower left branch of the curb bit in the left, the forefinger against the mouthpiece; bring the crownpiece in front of and slightly below its proper position; insert the left thumb into the left side of the mouth above the tush; press upon the lower jaw, insert both bits by raising the crownpiece, then with the left hand draw the ears gently under the crownpiece, beginning with the left ear; arrange the forelock, secure the throat latch and the curb chain, taking care to adjust them properly.

The bridle with snaffle bit only, used on team horses, is put on in a similar manner.

A bridle with curb bit only is not permitted to be used on the horses of individually mounted men, because the curb when used alone is a powerful instrument requiring such dexterity in its use that only an expert horseman on a perfectly trained horse is capable of using it with sufficient delicacy and discretion to obtain perfect control without injuring the horse.

A horse quickly resents and is easily frightened by abrupt or sudden movement about his head. Bridling should therefore be done in a most deliberate and careful manner. The ears are especially sensitive, and extreme care must be used in drawing them under the crownpiece and into their place. A reliable test that a horse has not been mistreated in bridling is that he permits, without sign of fear or resentment, the gentle stroking of his ears.

232. Except in the field, or when equipped for field service, or when the duty is such as to make it necessary to tie up a horse, the halter is taken off before bridling, the reins being first passed over the neck.

If the halter is not taken off, the halter strap is tied in the near pommel ring, or, if the horse be not saddled, around his neck. When the halter is to remain on, care should be taken that the halter rope is untied from the manger before attempting to bridle a horse that is liable to pull back.

TO FIT THE SNAFFLE BRIDLE.

233. (a) The cheek straps are adjusted so that they are of even length and so that the snaffle rests easily in, but does not draw up the corners of the mouth. A mouthpiece that is too low strikes the tushes and makes them sore; one that is too high causes the horse discomfort and makes the corners of his mouth sore.

(b) The browband is examined. If it is too short, it causes the sensitive skin at the base and back of the ears to be galled or cut by the crownpiece. If it is too high on the crownpiece, it causes the same trouble at the base and sides of the ears.

(c) The throatlatch is buckled loosely, being only sufficiently tight to prevent the crownpiece from slipping over the horse's ears. Generally speaking, it should permit the entire flat of the hand to be inserted between it and the throat when the horse's head is reined in. A tight throatlatch interferes with the large blood vessels of the neck, with the gullet, and also with the windpipe.

(d) The mane and forelock are carefully smoothed out under the crownpiece to avoid causing a sore at the poll and also to present a neat and tidy appearance.

TO FIT THE DOUBLE BRIDLE.

234. (a) The snaffle is fitted as described in the preceding paragraph.

(b) A curb bit is selected with a mouthpiece of such length that the branches bear easily against the horse's lips. A narrow

bit pinches the lips, while a wide one works about and bruises the lips and the bars. The mouthpiece is best examined for width by inspecting it from the underside of the lower jaw.

(c) The cheek straps are adjusted so that the mouthpiece of the bit rests as near as possible opposite the chin groove, but touching neither the tushes nor the corners of the mouth. Generally speaking, the bit should rest about 1 inch above the tushes of horses and about 2 inches above the corner teeth of mares. It rides below the snaffle.

(d) The curb chain is fastened outside and below the snaffle. It must be twisted to the right until it lies flat, and it should rest in the chin groove opposite the mouthpiece of the bit. If not properly adjusted, it will have a tendency to ride up and press upon the sharp bones of the lower jaw. The curb chain should be loose enough to admit the flat of two fingers between it and the chin groove when the branches of the bit are in line with the cheek straps. When brought to bear the branches of the curb bit should make an angle of about 45° with the line of the horse's mouth.

(e) The throatlatch and brow band are fitted as directed in paragraph 233.

TO REMOVE THE BRIDLE.

235. UNBRIDLE: Unbuckle the throatlatch. Grasp the middle of the reins with the crownpiece in the right hand. Take hold of the bit or bits with the left hand. Carefully and gently slip the crownpiece over the ears, at the same time steadying the bits with the left hand so they will not roughly strike against the tushes or teeth. Straighten the reins out together and fold them over the crownpiece. Hang the bridle on its peg.

TO STAND TO HEEL.

236. STAND TO HEEL: Each man stands at attention 1 yard in rear of and facing his heel post. At the picket line he is 1 yard in rear of and facing his horse.

TO STAND TO HORSE.

237. STAND TO HORSE: Each man places himself, facing to the front, on the near side of his horse, eyes on a line with the

front of the horse's head, so that he can see along the front, and takes the position of attention, except that the right hand, back uppermost, grasps both reins, forefinger between them, about 6 inches from the bit. The reins are on the horse's neck.

The left and right sides of the horse, facing to his front, are called the near and off sides, respectively.

TO LEAD OUT.

238. The men being at stand to horse in the stable or at the picket line, and the horses equipped with snaffle bridles, the instructor indicates the place of formation and commands: **LEAD OUT.**

Each man, holding his hand well up and firm, leads his horse, without looking at him, to the place designated by the instructor. If the horse shows a disposition to rush or to resist being led, the soldier takes the snaffle reins from the horse's neck, takes the end of the reins in the left hand and with the right hand holding the reins near the bit leads the horse as before. When leading through a low or narrow doorway, the horse should be quieted by the voice or caresses and not allowed to pass through hurriedly. To prevent the horse from rushing through a narrow doorway the instructor may direct the soldier to face toward the horse, holding one rein in each hand close to the bit, and lead him by stepping backward; after passing the doorway the soldier leads the horse as before.

Upon arriving at the place designated for the formation, the instructor disposes the men upon a line at intervals of one horse length, men at stand to horse and horses correctly disposed and perpendicular to the line of men.

A horse is correctly disposed when he stands squarely on all four feet, having his head, neck, and body in line.

ALIGNMENTS.

239. The men being in line at a halt at stand to horse, the instructor sees that the men on the flank toward which the alignment is to be made are in the desired position and commands: 1. **Right (Left)**, 2. **DRESS**, 3. **FRONT**. Executed as in

The Soldier Dismounted, except that the left hand is not placed on the hip, and each man moves his horse forward or backward, as may be necessary, to align him. The instructor may place himself on either flank and give a general alignment by ordering individual men to move their horses backward or forward.

TO MOUNT.

240. With saddle.—The soldier being at stand to horse: 1. **Prepare to mount**, 2. **MOUNT**. At the command **prepare to mount**, face to the right, take a step to the right to be opposite the shoulder of the horse; at the same time seize the end of the reins in the right hand and pull them taut enough to give a gentle, even bearing on the horse's mouth; cross the reins flat on the crest and grasp them with the left hand, which also holds a lock of the mane. Place the left foot in the stirrup, assisted by the right hand if necessary, bring the left knee against the saddle, and place the right hand upon the cantle.

At the command **MOUNT** rise by an effort of the right leg aided by the arms, the left knee bent and pressed against the saddle, the upper part of the body inclined slightly forward to prevent the saddle from turning; bring the right foot by the side of the left. Change the right hand to the pommel, pass the right leg, knee bent, over the croup without touching it, and sit down lightly in the saddle. Put the right foot in the stirrup, assisted by the right hand if necessary; take the reins as hereafter prescribed.

The instructor takes care that the rider in adjusting the reins provokes no movement and deranges in no manner the position of the horse's head.

The instructor cautions the rider to avoid touching the horse with the left toe in mounting. This fault begets nearly all the resistance of the horse to standing quietly while being mounted.

241. Without saddle.—Similarly executed (240) except that the right hand is placed on the back near the withers. At the command **mount**, the soldier springs upward and forward, bearing the weight upon the hands and wrists. He remains for a moment in this position, then throws the right leg, knee bent, over the croup without touching it and sits down lightly on the horse's back.

242. With saddle having stirrups crossed or detached.—Executed as prescribed for mounting without saddle, except that the right hand is placed on the pommel of the saddle.

243. To mount from the off side.—Executed as in mounting from the near side but by inverse means.

244. If the command be mount the men execute all that has been prescribed for prepare to mount and mount.

TO DISMOUNT.

245. With saddle.—1. Prepare to dismount, 2. **DISMOUNT.** At the command prepare to dismount, pass the right rein into the left hand and grasp with this hand a lock of the mane; remove the right foot from the stirrup and place the right hand on the pommel.

At the command dismount, rise upon the left stirrup, pass the right leg, knee bent, over the croup without touching the horse, and bring the right foot by the side of the left, the left knee against the saddle, the upper part of the body inclined slightly forward. Descend lightly to the ground and take the position of stand to horse.

246. Without saddle.—Similarly executed (245) except that the right hand is placed on the back near the withers. At the command dismount, rise upon the hands and wrists; pass the right leg, bent, over the croup without touching it, carry it to the side of the left; remain a moment in this position and come lightly to the ground, the heels joined, the knees bent. Take the position of stand to horse.

With saddle having stirrups crossed or detached.—Executed as prescribed for dismounting without saddle, except that the right hand is placed on the pommel of the saddle.

247. To dismount on the off side.—1. To the right. 2. Prepare to dismount. 3. **DISMOUNT.** Executed as in dismounting from the near side but by inverse means.

248. The men are frequently practiced in mounting and dismounting on the off side.

249. If the command be dismount, the men execute all that has been prescribed for prepare to dismount and dismount.

HOLDING THE REINS.

250. In both hands.—The snaffle reins are held one in each hand, the rein coming into the hand under the little finger and passing out over the second joint of the forefinger, on which the thumb, slightly bent, presses and holds it. The bight of the reins falls to the front and right. The reins bearing equally should be so held that the rider feels lightly the horse's mouth, the forearms horizontal, angle between arm and forearm approximating 90° ; elbows slightly to the rear, with the fleshy part of the forearm resting lightly against the body; the hands closed, backs outward and vertical; wrist and back of hand straight and in continuation of the forearm; hands approximately 9 inches apart and carried about one hand's breadth above the withers.

The double bridle reins are held two in each hand, as explained for the single reins above, except that the bit rein comes into the hand above the little finger, which separates the two reins.

In one hand.—The snaffle reins are held as explained for two hands, except that the right (left) rein comes into the left (right) hand above the little finger, which separate the two reins.

In the left hand the double bridle reins are held as explained for both hands, except that the right reins come into the hand, one on each side of the second finger, the snaffle rein uppermost, all four reins being pressed upon the second joint of the forefinger by the thumb.

In the right hand they are so held that there is one rein above each finger, left snaffle rein uppermost, and that four reins come out under the little finger.

TO TAKE THE REINS IN ONE HAND.

251. 1. In left (right) hand, 2. TAKE REINS.

The snaffle reins.—Place the left hand opposite the middle of the body and place in it the right rein, holding the reins as explained (250).

The double reins.—Place the left hand opposite the middle of the body; turn the right wrist to the left until the back is up;

carry the right hand to the left and insert the second finger of the left hand between the right reins, holding the reins as explained for the left hand (250).

To take the reins in the right hand they are first taken in the left as just described. Then turn the left hand back up and insert the extended fingers of the right hand between the reins so that there will be one rein above each finger, holding them as explained for the right hand (250).

TO RETAKE THE REINS IN BOTH HANDS.

252. The reins being in the left (right) hand: 1. **In both hands.** 2. **TAKE REINS.** Grasp the right rein with the right hand and hold both reins as heretofore prescribed.

TO ADJUST THE REINS.

253. The reins being in both hands.—To shorten the reins the rider brings the wrists together and grasps with one hand, above and near the opposite thumb, the rein that he desires to shorten. To lengthen the reins, the rider permits them to slip through his hands until the proper bearing is secured.

The reins being in one hand.—To lengthen or shorten the reins the rider holds the bight with the hand that was free, while the other one slides along the reins to secure the proper bearing.

TO DROP AND RETAKE THE REINS.

254. The instructor causes the reins to be dropped and retaken at the commands **DROP REINS** and **RETAKE REINS**.

At the first command the rider drops the reins behind the pommel or on the horse's neck near the withers and lets the hands fall by the side. It will frequently be advantageous to knot the reins before dropping them on the horse's neck.

THE STIRRUPS.

255. The stirrups are properly adjusted when, the rider being properly seated and the legs falling naturally, the tread of the stirrup is about 1 inch and a half above the top of the heel of the shoe.

The stirrups should bear only the weight of the leg; about one-third of the foot should be inserted in the stirrup, so that the ball of the foot rests on the tread, the heel lower than the toe.

The toe is inserted in the stirrup so as to cause the flat of the stirrup strap to rest against the leg.

Placing too much weight on the stirrup disturbs the seat and contracts the leg, hindering its freedom of action.

If the toe is not inserted far enough the rider risks losing his stirrup; if inserted too far suppleness is diminished.

For the extended gallop, for the use of weapons, and for leaping obstacles the foot is inserted fully in the stirrup.

The instructor teaches the soldier how to adjust his stirrups by using his arm to measure the proper length of strap.

POSITION OF THE SOLDIER MOUNTED.

256. The position described below should be considered a standard toward which all riders should gradually approximate.

ELEMENTARY TRAINING IN HORSEMANSHIP.

1. TEACHING THE AIDS AND THEIR CORRECT APPLICATION IN CONTROLLING THE HORSE.

288. The means at the disposal of the rider for controlling the movements and gaits of his horse are his legs, reins, and weight. These are termed the aids. On suitable occasions the aids are assisted or emphasized by a proper use of the spurs, the whip, and the voice. According to their very nature, the legs are the driving while the reins are the restraining aids. Both are effectively assisted by the weight of the rider. Of the two aids, the driving and restraining, the former are overwhelmingly predominating. As the training of a horse or rider progresses, the aids must become more refined and less noticeable until the horse, without perceptible effort on the part of the rider, seems to obey the latter's thoughts alone.

LEG AIDS.

289. The legs should be free from all involuntary movement and very steady in their action. A swinging leg confuses the

horse. The legs act by the pressure of the calves with heels well shoved down. They are applied gradually, according to the sensibility of the horse, so that the latter will not be surprised and give a sudden start. If pressure alone is insufficient the rider increases the action by taps with the calves, increasing in severity until obedience is obtained, when the action should cease.

The position of the lower leg determines the nature of its effect. Thus, if both legs are applied near the rear edge of the girth the effect should be to drive the horse forward or to increase his gait, while if one leg is drawn and applied a little further to the rear its effect, according to the intensity of its action, should be either to induce or to oppose a lateral displacement of the haunches. When the leg is thus drawn to the rear its position and action are referred to as either **sideward driving** or **supporting**.

REIN AIDS.

290. The reins serve to prepare the horse to move, to permit an extension of his gait, to reduce his gait, or to change direction. For effects to be exact the reins must maintain **contact**, that is, a soft elastic bearing of the bit on the bars of the mouth. A man who rides with this soft elastic bearing—that is, with **contact**—is said to have a **light hand**. It is obtained by maintaining a smooth and steady seat, by keeping the muscles of the shoulders and arms relaxed, and by keeping those of the fingers and wrists soft and springlike in their action. The hands should be perfectly steady, to insure which there should be no motion of the shoulders or elbows.

A few men in seeking light hands ride with loose reins. This is **no hand**, and should be avoided because the rider, having lost communication with the horse's mouth, does not have his mount under instant or prompt control. With the reins loose and flapping the indications of the hand will not reach the horse, or if they do they will arrive confused or in the form of brutal and awkward jerks.

A **heavy hand** is one which maintains such strong and constant pressure on the horse's mouth as soon to deaden it and destroy its sensibility. A heavy hand soon gives a horse a **hard mouth**.

In producing these various effects the reins act by a tension or a yielding. With a well-trained horse a sufficient increase of tension can usually be produced by a mere closing of the fingers and by an inward bending of the wrist. In doing this the middle joints of the fingers approach the body and the little finger moves upward. When a stronger effect is necessary the arm must take part in the movement. The increased action of the reins must cease as soon as the horse obeys the indication.

The rein is yielded when the little finger approaches the horse's mouth while the hand maintains contact. It is yielded in all those cases where it is desired to give the horse the freedom necessary to permit him to move out or to increase his gait. If it is intended to let the horse have sufficient freedom to extend his neck, the whole arm should take part in the movement or the reins should be permitted to slide through the fingers.

The full effect of the rein aids can be produced only when the two reins act reciprocally. A horse will obey the rein on one side by merely bending and turning the head and neck around to that side. This, then, becomes the *inner* or *direct* rein. In order to execute a turn properly, as well as to limit the bend of the head and neck, the counter action of the other rein is necessary; it then is termed the *outer* or *supporting* rein. Its action is usually a slight restraint of the hand, but may, under circumstances, increase to an active resistance or reining in. Either rein may be opened out away from the neck or closed in and bearing against it.

To execute a turn when riding with the reins in two hands, the inner hand is turned upward toward the body of the rider, the little finger rising toward the inner breast; this shortening of the inner rein will cause the horse to bend and go into the turn. The execution is faulty if the rider pulls the head and neck around until they are off the curve of the turn. This is a fault most easily acquired and most difficult to correct. The outer hand yields just sufficiently to permit the horse to obey the shortening of the inner rein, and determines and regulates the radius of the turn by the outer supporting rein bearing against the neck of the horse. Each hand should remain on its proper side; carrying the hands laterally across the withers is faulty. This combined use of the inner or direct rein and the

outer or supporting rein is the most favorable for teaching the Field Artillery horse, intended and used for draft, to step freely into the turn for which his head has been set and his neck bent. The direct rein alone finds constant application with the Field Artillery driver in the control of his offhorse, as, for instance, a feeling of this horse's right rein to cause him to bend and step into a turn to the right.

With the reins in one hand the turn is similarly executed, except that the outer rein predominates in its bearing action against the neck. Here the inner rein is shortened by turning the little finger toward or away from the body or by adjusting the reins before the turn was executed. The action of the hand is faulty if it crosses the withers.

All action of the reins should diminish in intensity when obedience begins, and cease entirely as soon as the desired result is secured.

For equitation work riders can not be too strong in their legs, and very few of them are sufficiently soft and elastic in the use of their hands. Most of the trouble the rider has in handling his horse can be traced directly to too little use of the legs and too much use of the hands.

During elementary instruction in equitation the reins should be habitually carried in both hands, as this obtains quicker results in the matter of hands and in the manageability of the horses. However, to prepare the rider for his work in driving, riding with the reins in one hand must not be neglected.

The buttocks bearing equally upon the saddle and as far forward as possible.

The thighs turned without constraint upon their flat side, clasping the horse evenly and stretched only by their own weight and that of the lower legs.

The knees bent and flexible.

The lower legs falling naturally, the calves in contact with the horse without pressure; the toes dropping naturally when the rider is without stirrups.

The back supple and never hollowed.

The upper part of the body easy, free, and erect.

The shoulders thrown back evenly.

The arms free, the elbows falling naturally.

The head erect without stiffness.

Eyes alert and sweeping the horizon.

The reins held as heretofore prescribed.

This position may be modified by the instructor to suit varying conditions and unusual conformations.

257. The body and the lower legs are movable and should be under the control of the rider, acting intermittently as aids for guiding the horse or as a means of combatting his resistance.

The thigh, on the other hand, should remain fixed immovably to the saddle except while posting at the trot. This fixity should be obtained, not by the pressure of the knees, but by the clinging of the buttocks, which is secured by the suppleness of the loins and the relaxation of the thighs.

If the buttocks are too far back, the rider is unable to conform to the movements of the horse and carries forward the upper part of the body. This defect is remedied by sitting well forward in the dip of the saddle.

If the thigh is too nearly horizontal, the rider is doubled up and his power of action diminished; if the thigh is too nearly vertical, the rider is on the crotch and lacks ease.

To sum up: The rider should take a sitting position with the thighs inclined downward.

The various defects of position are overcome by suitable suppling exercises.

THE RESTS.

258. Being at stand to horse, the commands are: **AT EASE** and **REST**, which are executed as prescribed in The Soldier Dismounted, except that each soldier retains his hold of the reins to keep his horse in place.

Being mounted and at a halt, the commands are: **AT EASE** and **REST**; if marching, **ROUTE ORDER**. At the command at **ease** the soldier may turn his head and make slight changes of position, but preserves silence.

At the command **rest** or **route order**, the soldier may turn his head, may talk, and make slight changes of position, but must not lounge on his horse.

To resume the attention: 1. **Squad**, 2. **ATTENTION**. The soldier, if dismounted, takes the position of stand to horse; if mounted, he takes the position of the soldier mounted.

TO DISMISS THE SQUAD.

259. The squad being in line at stand to horse: 1. By the right (left, or right and left), 2. **FALL OUT.**

The man on the right leads his horse 1 yard to the front and then directly to the stable or picket line. Each of the other men executes in succession the same movement so as to follow the horse next on the right at a distance of 1 yard.

Being in column of files or twos, at the command **FALL OUT**, the leading rider or the rider on the right of each two leads out as prescribed and is followed by the other riders in turn.

The men remove, clean, and put the equipments in place, and care for and secure their horses under the direction of the instructor.

The instructor, having satisfied himself by inspection that the horses and equipments are properly cared for, and that the precautions required for the care of horses on their return from exercises have been observed, orders that the men be fallen in, marched to the battery parade, and dismissed.

THE WEIGHT.

291. The weight of the rider when properly used in connection with the reins and the legs is a very important aid, which, moreover, is entirely independent of the sensibility of the horse's mouth and sides. Its use enables the horse to understand more intelligently and more easily to obey the leg and rein aids.

The use of the rider's weight as an aid will work to the best advantage if the horse's and the rider's centers of gravity were previously in the same vertical line. The knack of going with the horse lies in the ability of the rider to harmonize his center of gravity with that of his horse. The rider who is properly going with his horse should feel as if he and his horse were one in all movements. It is also the easiest way for a horse to carry a rider's weight. On the other hand, a rider who does not possess this knack of going with his horse, by a faulty placing of his weight, will disturb both the gait and the carriage of his horse.

With a correctly gaited horse, the centers of gravity of horse and rider will both fall in the same vertical line if the latter

maintains a correct seat and carries his upper body erect. Every deviation from this direction denotes a weight aid.

The rider must then be warned not to hinder the movements of the horse by a bad division of his weight, but, on the contrary, to favor them by acting always in the direction sought.

In moving, stopping, turning, and on two tracks, the rider, by carrying his weight on the buttocks or thighs in the direction of movement may facilitate and hasten the obedience of the horse. These displacements of the weight are quite emphasized in the early handling of the young horse. But they become more and more discreet as his training is perfected.

USE OF THE SPURS.

292. The spurs are used with horses that are sluggish in obeying the leg aids, as a summons to greater efforts or as a means of punishment.

If used to assist the leg aid the spur should be applied more or less delicately, according to the sensibility of the horse, but not until the leg aid has already been applied. The position of the lower leg must not be disturbed thereby. The rider should avoid digging into the horse's sides. To urge a horse to make greater use of his strength, or as a means of punishment, one or more raps with the spur are administered in the same place, the point of application being immediately in rear of the girth.

If, on very rare occasions, it becomes necessary to administer punishment, the rider before doing so must make sure in his mind that there is actual disobedience, that his demands have not been too great; and that he has not given confusing, contradicting, or incorrect indications. Punishment should never be administered in the heat of anger. Such a state of mind disturbs the understanding between rider and horse and undermines the confidence which the horse should have in his rider.

An independent seat and equestrian tact are absolutely necessary in using the spurs to reinforce the leg aids.

The recruit should not be permitted to ride with spurs until he has acquired a proper seat and balance, and until he has learned to apply the aids correctly.

THE WHIP.

293. The whip is used principally in training the remount, to teach him to understand the action of the legs. It is also of important assistance to the Field Artillery driver.

It is not used in elementary instruction of recruits, since the tendency would be to depend on its use rather than to learn the proper application of the legs.

THE VOICE.

294. The voice, like the weight, is entirely independent of the sensibility of the horse's mouth and sides. It is particularly valuable in training the remount to understand and obey the rein and leg aids. It is not needed by the expert horseman on a properly trained horse, nor should it be used in the instruction of recruits, since the tendency would be for the rider to resort almost wholly to it, and thus neglect his rein and leg aids. For the Field Artillery driver it is of important and powerful assistance.

THE USE AND ACCORD OF THE AIDS.

295. The beginner must not only learn how and when to apply a given aid, but he must also be made to understand why it should be applied.

To obtain successful results it is essential that the aids be applied at the right moment, also that they be applied correctly, as follows: First, their application must be intermittent, that is, when an aid is employed to effect a movement the action must be relaxed as a reward for obedience the moment the horse yields in the slightest. The aid should be reapplied and released and reapplied and released until the horse has yielded and completed the movement desired. In other words, when the desired effect has been gained the application of the particular aid which has been used must cease lest the horse becomes insensible to its action. The continual pressure of the legs, for example, would soon make the animal so insensible to leg pressure that he would notice it no more than he does the pressure of the girth.

Second, the aids must be used in the proper relationship, that is, they must mutually assist, not oppose, each other in their action. This is a very common fault, as, for example, demanding one thing with the legs and contradicting it with the hands, or applying one leg to swing the haunches and unconsciously contradicting the desired movement with the other leg. To combat this fault is one of the objects of the suppling exercises.

Third, the aids should be used gently, commencing with the mildest, and gradually increasing to a more pronounced form of severity. An aid applied so suddenly or so severely as to make the horse give a sudden jerk, jump, or start is an aid very faultily applied. Such an application of the aids tends to spoil the responsiveness of the horse and ruin his confidence in the rider.

A horse can be properly controlled only by the accord of the different leg, rein, and weight aids. Success depends not upon the strength used but in the tactful employment of the aids. The ability to recognize at any moment what aids are necessary and to combine them correctly to produce the desired effect constitutes equestrian tact.

2. APPLICATION OF THE AIDS.

USEFUL TERMS EMPLOYED.

296. Interval: The open space between two adjacent riders, measured from stirrup to stirrup.

Distance: The open space measured from the tail of the horse in front to the head of the following horse. Distances are measured in horse lengths and in yards.

Boot to boot: Riders are said to be boot to boot when the stirrups of adjacent riders touch.

Inner side: The inner side, in case of a horse placed straight, is the side toward the interior of the school; in case of a horse that is bent or set it is the side toward which he is bent or set. The other side is the **outer side**.

Inner aids: These are the rein and leg aids on the inner side of the horse. The other rein and leg aids are the **outer aids**.

Tempo or cadence: This denotes the speed with which a horse covers a certain distance at a certain gait. A proper conception of tempo implies also the presumption that the steps or strides constantly follow each other in the same uniform interval of time and are always of uniform length. The tempo is lively or slow, depending upon whether a great or small distance is covered in a particular unit of time.

Accurate tempo is the foundation of steadiness in all movement. Therefore every rider from the very beginning of his riding instruction must learn to acquire this instinct for cadence and be able to induce or produce it at all gaits and to sustain it uniformly throughout any gait.

To the right (left) hand: A rider marches to the right or left hand accordingly as his right or left hand is toward the interior of the school.

GATHERING THE HORSE.

297. Before the horse is required to execute any movement he should be given a preparatory signal. Whatever the movement to be executed, the signal is always the same. Its object is to attract his attention and to prepare him for a movement. This is called **gathering the horse**.

Having a light pressure of the bit against the horse's mouth and a light feel of the lower legs against his sides, the rider, in order to gather him, increases the pressure of the lower legs, with heels well shoved down, and slightly increases the tension of the reins. These pressures are increased intermittently until the elastic movement of the horse under the rider indicates that the former has observed the signal.

If, when at a halt, the horse backs, or when marching decreases the gait, the tension applied to the reins has been too great. If, when at a halt, the horse moves forward, or when marching he increases the pace or gait, the impulse given with the legs has not been met or controlled by the reins.

Each force should exactly balance the other, and the horse, held between the two, should feel responsive to the indications and aids of the rider.

TO MOVE FORWARD.

298. Being at a halt: 1. Forward; 2. MARCH. At the first command the rider gathers the horse; at the second he simultaneously (1) pushes his buttocks to the front, (2) acts with both legs according to the temperament of the horse, (3) eases the reins by slightly relaxing the fingers and giving the wrist, without losing contact. The aids cease to be active as soon as obedience is obtained.

TO HALT.

299. Being at the walk: HALT. The rider sits well down in the saddle and gathers the horse; he then simultaneously (1) closes the fingers on the reins, bending the wrist, and, if necessary, moving the hands in and back with the body; (2) slightly increases the pressure of the legs; (3) imposes the weight of his body against the horse's back by convexing his loins backward.

As soon as the horse slackens the gait ever so little the pressure of the fingers and legs is slightly relaxed to reward him for his obedience. It is then reapplied and again relaxed until the horse has completed the movement desired.

In order to prevent the horse from halting entirely on the forelegs, the rider must increase the pressure of his legs to induce the horse to engage his hind legs farther under the mass. By convexing his loins and imposing his weight against the muscular activity of the horse's back, the rider limits the functioning of the muscles which control impulsion and thus permits the hind legs to participate in stopping or in reducing the gait. It is faulty to lean back in an exaggerated position, because of the tendency to permit the legs and thighs to go forward and to act with a dead pull of the reins on the horse's mouth; if done abruptly, it is painful to a horse and may cause him to halt in a hard and jolty manner.

In reducing the gait a steady pull against the mouth must be particularly avoided.

THE HALF HALT.

300. The half halt finds constant application in the training of both horse and rider. It is a brief, energetic action of the

hands, which the rider executes with the fingers closed on the reins by twisting the wrist quickly from below upward and from front to rear, without losing contact and without stopping the horse. At the same time the rider momentarily closes his legs and convexes his loins as in the halt. The half halt is used to slow up horses that are too ambitious or to carry to the rear the excess of weight that some badly balanced horses allow to come on the shoulders. It is effected according to need, on one rein, on two together, on the snaffle, or on the curb. The hand should regulate the power of its action by the resistance of weight which it meets.

CHANGES OF GAIT.

301. To pass from the halt or the walk to the trot or the gallop, the means prescribed for passing from the halt to the walk are employed and continued until the desired gait is taken.

To pass from a faster to a slower gait, or to a halt, the means prescribed for passing from the walk to the halt are employed and continued until the desired gait is taken or the horse has stopped.

The commands are: 1. Trot, 2. **MARCH**; 1. Gallop, 2. **MARCH**; 1. Walk, **MARCH**; and **HALT**.

EXTENDING OR REDUCING THE SPEED AT THE VARIOUS GAITS.

302. To extend or reduce the speed at any gait the rider employs the means prescribed for passing from the halt to the walk or from the walk to the halt to the extent necessary to obtain the desired results.

The horse in extending the walk increases the amplitude of the movement of his head and neck to the same degree as he increases the length of his step; he accelerates the movement of his head as he increases the cadence or tempo of his step.

The rider aids these movements by yielding the hand and giving the horse greater freedom of movement. He maintains contact so that he can exercise gradual restraining influence with the direct rein when he feels the horse is about to spring into the trot.

To reduce the walk the rider makes use of the direct rein and legs as in coming to the halt. The step is shortened and the cadence or tempo decreased.

To extend or reduce the trot, the same means are used. The exercises in extending and reducing the gait afford excellent practice for the rider in the use of the aids and good training for the horse in obeying them, but the soldier out of ranks should use only the regulation gaits.

Changes of speed are executed at the commands: 1. **Slow walk** (trot or gallop), 2. **MARCH**; or, 1. **Walk** (trot) out, 2. **MARCH**; or, **Extended gallop**, 2. **MARCH**. The normal speed is taken at: 1. **Walk** (trot or gallop), 2. **MARCH**.

To increase or decrease the cadence or tempo at any gait the instructor may caution: **Extend** (**Reduce**) the gait.

CHANGES OF DIRECTION.

303. At a walk the changes of direction are made on the arc of a circle the radius of which is 3 yards. This is the sharpest turn that a horse can execute as a one-track movement. Such a movement is one in which the haunches accurately follow the track of the forehand. At fast gaits, where the horse is more or less extended and therefore harder to bend, the radius of the turn must be correspondingly increased.

TO MARCH BY THE FLANK.

304. Being at the halt or marching: 1. **By the right (left) flank**, 2. **MARCH**. The rider gathers the horse; the right rein, acting as the inner or direct rein, leads the horse into the turn and induces the proper bend; the right leg, applied at the girth, drives the right hind foot forward. The left rein, acting as a supporting rein, regulates the set of the head, limits the radius of the turn, and, together with the left leg, applied behind the girth, bends the horse on the curve over which he is turning and prevents the outer hind feet from falling out. After the forehand has been led in the new direction the action of the inner rein is diminished, and as soon as the horse has turned

through an arc of 90° he is straightened and then directed and maintained on the new line.

It is important that the horse's body from poll to croup be bent to conform to the curve over which he is moving. (Pl. 42.) This will at times require a modification of the application of the aids as described above; that is, if the horse tends to carry his haunches to the inside of the curve the action of the inside leg should predominate, while if he tends to carry them to the outside of the curve the action of the outside leg should predominate.

During the movement the rider takes care to sit slightly more on the inner buttock, without advancing or drawing back his outside shoulder.

When the reins are carried in one hand the action of the supporting or bearing rein predominates.

305. If the commands be: 1. **Right** (left) oblique, 2. **MARCH**; or **Right** (left) about, 2. **MARCH**, the arc of the turn is 45° or 180° , respectively.

CIRCLES.

306. Riding on a circle, when properly done, is an exercise that is especially valuable for both rider and horse. It teaches the rider properly to coordinate his rein, leg, and weight aids. By compelling the inside hind leg to flex itself more and to carry more weight than when riding on a straight line it supple, strengthens, and increases the handiness of the horse.

To ride a circle properly and exactly, the horse must be constantly changing direction. To do this he must be bent to conform to the curvature of the circumference. If the horse is properly bent on the circle, the imprint of each inner hind foot should follow that of the inner front foot, and the outer hind foot that of the outer front foot.

Application of the aids.—Before going on the circle from any tack the rider should gather the horse by giving a half halt and should then slightly displace his weight by sitting a little more on the inside buttock. The aids are applied as in the turns—that is, the inner leg applied at the girth drives the side hind foot forward—the inner rein gives the proper bend

and set and conducts the horse on the circle at the tangent point. The outer leg applied behind the girth prevents the haunches from falling out. The outer rein assists the outer leg and regulates the set.

It is of great advantage frequently to vary the size of the circle so as to vary the bend of the horse.

TO BACK AND HALT.

307. Being at the halt: 1. Backward. 2. MARCH. 3. HALT. At the first command the rider shoves his loins forward, gathers his horse, and straightens him. At the second command he reins back straight in the direction of the hind feet, inducing the horse to go back quietly in a straight line, one step at a time. With each step to the rear the reins are relaxed as a reward for the animal's obedience. The legs take a supporting position close to the horse's sides in order to prevent the haunches from escaping to either side.

At the third command the action of the reins ceases while the legs change their action from supporting to that of driving in order to check and stop the movement.

Since every loading down of the haunches will make the raising and setting back of the hind feet more difficult, the rider, if he meets resistance, should be careful not to lean back too far, but should lean forward slightly and push his loins forward. Likewise, the rider must avoid raising the horse's head, since an elevated position of the head also constrains the muscles of the loins and so renders the backward movement more difficult for the horse. If the horse refuses to back, he should be made to take one or two steps forward or to one side on the forehand to flex the muscles of the hind quarters and advantage then taken of this flexed condition to cause him to back.

Backing is not correctly done until the horse steps back thoroughly responsive to the aids and against the bit.

To avoid getting the horses behind the bit the instructor should always cause the riders to move their horses forward a step or two immediately after halting. Backing should never be executed for more than about 5 yards at a time.

TO TURN ON THE FOREHAND.

308. Being in line or column at the halt: 1. **On the forehand,** 2. **To the right (left), or,** 2. **To the right (left) about,** 3. **MARCH.** The horse is first put up against the bit, or gathered. The rider then takes a slight set of the head toward the side of the turn. The inner right leg is applied behind the girth and when necessary is accompanied by the action of the inner rein. The haunches are swung step by step around the opposing forehand until a turn of 90° or 180°, respectively, is completed. Every step of the haunches is regulated accurately by the outer supporting leg applied behind the girth in such a manner that there is a decided pause between steps, thereby preventing the haunches from rushing. Both during and after the movement the rider's legs and seat should insure that the horse does not back but remains up against the bit. A stepping forward usually indicates a falling out of the outer shoulder and must be counteracted by the outer rein. The inner rein should not act so strongly as to bend the neck, except in case of a green horse that does not understand the leg aids, or with a horse that offers resistance.

The turn on the forehand is not a real schooling lesson, because the haunches are disburdened and the horse thrown on the forehand. For this reason it should not be repeated very often.

As a rule, turns on the forehand are practiced only in the early training of the horse. Their principal purpose is to teach the rider the correct use of the sideward driving inner leg aid, the inner rein, and the outer supporting leg and rein.

As the movement has a great tendency to make the horse reluctant in going up promptly against the bit, the turn should be always immediately followed by a movement to the front at a free walk or at a trot, and it should never be exacted of young horses until the straight-ahead movement has been well confirmed.

TO TURN ON THE HAUNCHES.

309. Being in line or column at the halt: 1. **On haunches,** 2. **To the right (left), or,** 2. **To the right (left) about,** 3. **MARCH.** The rider puts his horse against the bit, gathers him, and sets

the head to the side of the turn. The inner right rein begins and induces the turn, then carried well away from the neck, leads the forehand step by step around the haunches through a turn of 90° or 180°, respectively. The inner right hind foot must be kept in place during the turn. To accomplish this, the outer rein should be reined in in the direction toward this foot. The outer hind foot must be prevented from falling out by the supporting action of the outer leg. Both of the rider's legs, but especially the inner one, prevent the horse from stepping back during the turn. It is a lesser mistake if the horse steps forward. The rider should place a little more of his weight on the inner buttock.

The instructor must see that the rider's legs and weight are placed as above described and that the tendency to let the legs fly away from the horse's sides be completely overcome.

4. USEFUL FORMATIONS AND EXERCISES.

339. The following exercises are not only of value in teaching the application of the aids, but they are of use in forming, placing, or marching the squad either in the riding school or outside.

GUIDES.

340. When two or more soldiers march in line the instructor, as soon as the march is begun, may designate the element on one flank or the other as the guide of the movement, thus Guide right (left).

The other men align themselves on the guide thus indicated and maintain their intervals from that flank.

When marching in line and the guide is not announced by the instructor, the element in the center is, without indication, the guide of the movement.

If marching in column of files, or if marching obliquely, the leading element is, without indication, the guide of the movement.

The guide is responsible that the direction and rate of march are properly maintained.

TO BREAK FROM LINE INTO COLUMN OF FILES.

341. Being boot to boot in line, at a halt: 1. Right (left) by file, 2. MARCH. The man on the right moves his horse straight to the front at a good walk. When within 3 yards of the track, or, if outside, when he has advanced 3 lengths to the front, he executes by the right flank, and takes the track or moves straight in the new direction. Each of the other men in succession, when the rider on his right has advanced about 2 yards, moves his horse straight to the front and executes by the right flank on the line established by the first rider. The men then follow each other in column at about one horse length.

If marching, all halt at the command march, except the man on the right. The movement is then executed as from a halt. If it is desired to execute the movement at the collected trot or gallop the command for the gait precedes the command march. Each rider first moves one horse length to the front at a walk and then takes up the gait ordered.

If in line with intervals of one horse length, the movement is similarly executed, each man moving out when the croup of the horse on the right is opposite his own horse's head.

If it is desired to march at greater or less distances the command: At (so many) lengths (or yards) distance precedes the first command, and the riders gauge their distance accordingly.

Every horse must remain against the bit, stand squarely on all four feet, and absolutely still, until the rider gives the proper aids to move out. The rider must then make him move straight to the front and execute the turn properly, and not permit him to oblique off to the right.

TO INCREASE DISTANCES IN COLUMN.

342. Being in column on files at the halt: 1. To (so many) lengths (or yards), 2. Take distance, 3. MARCH. The leading man moves out at the command march. The men in rear move out successively, each as soon as the man preceding him has gained the distance prescribed in the command.

If marching at the walk, the leading man continues the walk; the other men halt at the command march and then execute the movement as before.

If marching at the trot or at the walk and the command be trot, the movement is similarly executed, the leading man moves at the trot, the other men take or continue at the walk, and then take up the trot successively in time to conform to the movement.

The commands are the same, and the execution is similar when the riders are in column of twos.

TO DECREASE DISTANCES IN COLUMN.

343. Being in column of files at the halt or marching at the walk: 1. To (so many) lengths (or yards), 2. Close, 3. **MARCH**. The leading rider remains halted or halts. The remaining riders move or continue at the walk, each one halting successively, when the distance from the head of his horse to the croup of the one in front is that prescribed in the command.

If marching at the trot or at the walk and the command be trot, the leading man moves at a walk. The men in rear continue at or take up the trot, each one taking the walk as he gains the prescribed distance.

The commands are the same and the execution similar when the riders are in column of twos.

TO FORM LINE TO A FLANK FROM COLUMN OF FILES.

344. 1. Right (left) into line, 2. **MARCH**, 3. Squad, 4. **HALT**. The leading man marches by the right flank; all the others continue straight forward, and each successively marches by to the right flank when 1 yard in rear of the point where the man preceding him began to turn. The leading man halts at the command; each of the others halt when on a line with the leading man and to his right.

The instructor is careful to see that the horses when halted are correctly disposed and perpendicular to the line.

The execution of this command places the men in line boot to boot. Should the instructor desire the interval other than this he precedes the above command with: At (so many) lengths (or yards) interval.

345. 1. On right (left) into line, 2. **MARCH**, 3. Squad, 4. **HALT**. Executed as in the preceding paragraph except that each

man successively turns to the right when 1 yard beyond the point where the preceding man began his turn. Should the instructor desire an interval other than that of boot to boot, he precedes the above command with: **At (so many) lengths (or yards) interval.**

TO FORM COLUMN OF TWOS FROM COLUMN OF FILES.

346. Being in column of files at the halt, or marching at the walk: 1. **Form twos**, 2. **Right (left) oblique**, 3. **MARCH**. The leading man moves one horse length to the front and halts. The second man obliquies to the right until uncovered, when he marches straight to the front and halts boot to boot abreast of the first man. The third man closes to 1 yard from head to croup on the first man, the fourth man obliquies to the right, and so on down the column, each man looking ahead in sufficient time to avoid obliquing out of the column if he is to become the left man in a set of twos.

If marching at the trot or at the walk and the command be **trot**, the leading man moves at a walk. The men in rear continue at, or take up, the trot, each one taking the walk as he reaches his place in column of twos.

TO FORM COLUMN OF FILES FROM COLUMN OF TWOS.

347. Being in column of twos at the halt: 1. **Right (left) by file**, 2. **MARCH**. The right man of the leading two moves straight to the front. The man on his left holds his horse straight until the first man has passed him, when he executes **right oblique** and follows at one horse length from head to croup. Each of the other twos breaks in the same manner as soon as the left man of the preceding two commences to oblique.

If marching at the walk the right man of the leading two continues the walk; the other men halt at the command **march** and then execute the movement as before.

If marching at the trot or at the walk and the command be **trot**, the movement is similarly executed, the right man of the leading two moves at the trot. The other men take, or continue at, the walk, and then take up the trot successively in time to conform to the movement.

TO BREAK FROM LINE INTO COLUMN OF TWOS.

348. Being boot to boot in line at a halt and twos counted from right to left: 1. Right (left) by twos, 2. **MARCH.** Executed as in paragraph 341, except that each two in succession moves out together so as to follow in column at a distance of 1 yard. The rider on the side toward which the turn is made marches by the flank as soon as he has gained the prescribed distance to the front. The man on the outside of the turn conforms. He slightly increases the gait of his horse so as to come abreast of the other man just after the turn is completed.

TO FORM LINE TO A FLANK FROM COLUMN OF TWOS.

349. Executed at the commands, and, with obvious modifications, as prescribed in paragraphs 344 and 345.

TO CHANGE DIRECTION.

350. Being in column of files: 1. Column right (left), 2. **MARCH.** The leading man marches by the flank, the other men march squarely up to the turning point and execute the change of direction successively on the same ground. Column half right (half left) is similarly executed, the change of direction being 45° instead of 90°.

Being in column of twos. The movement is executed by the same commands as in the preceding paragraph. In each set of twos the man toward whom the turn is made executes by the flank. The man on the outside of the turn conforms. He slightly increases the gait of his horse so as to come abreast of the other man just after the turn is completed.

5. GAITS.

351. Three gaits are recognized in military equitation, drill and maneuver, as follows: The walk, trot, and gallop. These, however, are subject to different rates of speed. Those usually considered are as follows:

Slow walk: 2½ to 3 miles per hour, 66 to 88 yards per minute

Walk (regulation): 4 miles per hour, 118 yards per minute

Walk out: 4 to 5 miles per hour, 118 to 147 yards per minute.

Slow trot (a jog trot): 6 to 6½ miles per hour, 176 to 190 yards per minute.

Trot (regulation): 8 miles per hour, 235 yards per minute.

Trot out: 10 miles per hour, 295 yards per minute.

Extended trot: 12 miles per hour, 352 yards per minute.

Slow gallop: 9 to 10 miles per hour, 265 to 295 yards per minute.

Gallop (regulation): 12 miles per hour, 352 yards per minute.

Extended gallop: 16 miles per hour, 470 yards per minute.

The slow trot and slow gallop are the gaits most used in the early training of recruits. They are especially valuable for riding without reins or stirrups and for the suppling exercises. The slow walk is used when marching with dismounted troops; it is used but little in training the rider.

At the regulation or maneuver gaits experience has shown that the speed is such as, on the average, to render the horse capable of longer sustained action without waste of energy, and that his endurance and useful work are accordingly greater than at the other speeds. Extended speed at any gait rapidly exhausts a horse and should therefore be avoided, while a slow speed at any gait does not work the horse to his limit of greatest efficiency. The regulation gaits are therefore used habitually when riding out of doors. The work in the extended area during the third period (356) must be such as thoroughly to impress the cadence or tempo of these gaits on the minds of the men.

THE WALK.

352. The walk is a gait in which the feet are lifted in succession and put down in the order of their lifting. If the right front foot begins the gait, the other feet are lifted in the following order: Left hind, left front, right hind. The walk should be free, easy, and elastic.

THE TROT.

353. The trot is a gait at which the horse springs from one, diagonally disposed pair of feet to the other; between the beats

all the feet are in the air. The right front and the left hind are called the right diagonal, the left front and the right hind the left diagonal.

THE GALLOP.

354. The gallop is the most rapid of gaits. It must not be used unnecessarily over long distances, particularly on hard roads, where the concussion on the feet is severe, nor when the saddle is packed. However, when the rapidity of the normal trot is not sufficient, the rider, when out alone, should take the gallop in preference to increasing the speed of the trot.

The horse is said to lead right when the feet on the right side are more advanced than the corresponding feet on the left side. When the feet are advanced in the inverse order the horse is said to lead left.

The gallop is marked by three beats and a period of suspension. If the horse be leading right, the first beat is marked by the left hind foot, the second by the nearly simultaneous placing of the right hind and left front feet, and the third by the placing of the right front foot. The horse then leaps into the air from, and advances, the right front foot. In leading left the beats are right hind, left hind, and right front, left front.

A horse gallops true when he leads right in turning to the right, and leads left in turning to the left.

He gallops false when he leads left in turning to the right or conversely. A horse is united when he gallops right (left) in front and right (left) behind. He is disunited when he gallops right in front and left behind, or conversely.

The gallop should be begun on the circle, because the feet are then favorably placed for taking and maintaining the proper lead. The horses thus start off more calmly and the rider is enabled to regulate the pace by describing a circle of greater or less circumference.

As soon as the horse breaks into the gallop the rider should move in cadence with his horse. The back and legs unite in the rhythm of the gait, the hands accompany gently and without exaggeration the movements of the head and neck.

During the gallop the command at ease is frequently given. The riders execute the suppling exercises which have been la-

licated as necessary in each case; they abandon themselves completely to the motion of the horse and thus acquire ease and flexibility. Prolonged periods at the gallop on calm and free-moving horses are most favorable for easily obtaining this result.

WORK ON VARIED GROUND.

357. The work on varied ground has for its object the training of the men in riding their horses over any terrain, in making them familiar with difficult routes and crossings which they might encounter in campaign, and in regulating their gaits so as to husband the strength of their horses.

The instructor conducts his class across fields, through woods, and in general over the most varied terrain at his disposal.

He may divide the squad into small groups, each under a noncommissioned officer, who conducts the group and regulates the gait over a route designated by the instructor.

358. The instructor inculcates in the riders the principles which should govern them when left to their own devices, such as the following:

On leaving the stable move at a walk for at least a mile in order to get the blood circulating in the horse's legs.

Vary the gait, but in training do not depart from the regulation speed prescribed for each gait.

Choose for the rapid gaits nearly level ground. Going uphill rapidly necessitates great effort on the part of the horse, but it is better than going downhill at a rapid gait which exposes him to injuries from the saddle and equipment, and is hard on his forelegs.

Extend progressively the periods at the faster gaits.

Regulate the periods spent at the intermediate gaits by the degree of rapidity with which the total distance must be covered.

Seek, under all circumstances, good and, if possible, soft footing to save the horse's legs, and keep him, therefore, along the edge of metaled roads rather than on them.

Choose hard ground when smooth and level in preference to ground that is heavy, uneven, or sloping to one side, as, for instance, the sides of a high-crowned metaled road.

Finish at a walk, more or less prolonged as the journey has been more or less long and trying, so that the horse shall always come in with a dry skin and normal respiration.

359. To these general principles which must be practically demonstrated, the instructor adds such counsel as his experience dictates and such remarks as the nature and state of the terrain may render advisable.

The following rules cover the majority of circumstances that will arise:

To ascend a steep slope, yield the hand as soon as the horse has been given his direction, carry forward the upper part of the body, and seize a lock of the mane near the middle of the neck under the reins.

To descend a steep slope, let the reins slip through the hand sufficiently to give the horse complete liberty of action; if necessary, grasp the cantle of the saddle with the right hand and maintain the body in a position about perpendicular to the horse's back.

Riders should be practiced in crossing a V-shaped ditch, about 18 feet wide and 10 feet deep, so that they go down one side and up the other. This is a valuable exercise, as no horse will face the opposite bank unless his head is left free.

Long steep slopes should be ascended slowly and quietly, and when the top is reached the rider should dismount and permit his horse to blow.

All slopes should be descended directly; short, steep slopes should be ascended directly; long slopes may be ascended obliquely if the surface is not slippery.

In difficult ground the horse should be allowed to take the initiative; his instincts are a more reliable guide than the aids of the rider.

If marshy ground must be crossed, go slowly and avoid following in trace. If the horse goes down and becomes nervous and begins to plunge, dismount and lead.

The rider must learn to seek every means to spare his horse especially when carrying a pack. In particularly difficult places he should dismount and lead.

The instructor gives the men much practice in riding across ditches and ravines, such as might be encountered in draft

He impresses them with the necessity of confirming the horses in crossing such places willingly, quietly, with even gait, and with no tendency to jump.

300. Advantage is taken of the work during this period to teach the men how to cover distances at the different rates of speed as employed by couriers and artillery scouts and agents. The rates of speed prescribed for this duty are **ordinary**, about 5 miles per hour; **rapid**, 7 to 8 miles per hour; and **urgent**, the highest speed consistent with certainty of arrival at destination. The men must be taught that the condition of the horse, the weather, and the state of the roads may make it necessary to diverge considerably from the speed ordered. The messenger must get his horse through. In peace this must be done without injury to the animal; in war it may be necessary to do it at the cost of fatally exhausting him.

The messenger rides the regulation gaits unless these are manifestly unsuited to his horse, in which case he rides at each gait, the tempo best suited to preserve the animal's strength.

The following variations in gaits are suggested as affording guides by which the various rates of speed may be ridden. In each case it is assumed that the horse is in condition, and that he has been warmed up by gentle exercise, and is therefore ready for increased effort.

Ordinary: Alternate 5-minute walk periods with 10-minute trot periods, and rest for the last 10 minutes in each hour. This, at the regulation gaits, gives $5\frac{1}{2}$ miles per hour, and with alternate walk and trot periods of these lengths, the number of minutes of travel always closely approximates the number of tenths of miles covered. Thus after riding 18 minutes the messenger has covered 1.8 miles.

Rapid: Alternate 5-minute walk periods with 10-minute gallop periods, and rest for the last 10 minutes in each hour. This, at the regulation gaits, gives $7\frac{1}{2}$ miles per hour.

Urgent: Combine walk, trot, gallop, or extended gallop periods as the particular case demands and as seem best adapted to save the horse. The longer the distance to be covered, the less must be the rate in miles per hour. Thus a horse of good breeding and in hard condition may be expected to cover 15 miles in one

hour, while if the distance to be traversed is 30 miles, he should be given at least four hours if injury is to be avoided.

Similarly, the horse should not be pushed to his extreme speed unless the distance is very short.

Whether the speed to be ridden be ordinary, rapid, or urgent, the messenger at all halts must dismount and slightly loosen the girth to relieve the pressure from the back and to facilitate easier and deeper breathing. Unless scouring, the animal should be permitted to graze.

Frequently when trot periods and always when gallop periods are used the rider should make it the rule to dismount and lead his horse during the walk periods. Gallop periods or trot periods, when the rate is ordinary or rapid, should not, even for a horse in hard condition, be prolonged for more than 25 minutes without alternating with a walk period. When using the posting trot it is of little or no advantage to change diagonals during a trot period. It is easier on the horse to wait until the next trot period and then to post on the other diagonal. The messenger must endeavor to water his horse with sufficient frequency as to preclude his taking at any one time a big, heavy drink. Whenever it is possible or practicable to do so, the messenger should leave behind unnecessary articles of clothing or equipment so as to lighten to the utmost the load which his horse will have to carry. In many cases, however, it may be necessary for him to ride with full pack and also to carry food for himself and grain for his horse. The rider himself must be physically fit. A tired rider fatigues his horse very much.

Distance rides, which tax to the utmost the endurance of both horse and rider, are the supreme and final tests of horsemanship.

363. To prepare recruits for their work with teams it is advantageous during this period frequently to form the section in a number of squads each composed of six or eight men in column of twos simulating six or eight horse teams. Such a formation is favorable for teaching the men the evolutions encountered in the battery mounted and for teaching them to obey signals and bugle calls. It is especially favorable for teaching the relative positions of the various horses of a team during a turn such as is involved in an about or a movement by the flank of an artillery carriage.

364. For horse batteries it is of advantage during this period occasionally to form and maneuver the men under instruction as mounted gun squads.

Section 12. The Gun Squad Mounted.

365. The special instruction required for the cannoneers of a battery of Horse Artillery embraces that of a gun squad mounted and that of two or more gun squads mounted.

COMPOSITION OF THE GUN SQUAD.

366. Each gun squad is organized as in paragraph 135. Two of the privates act as horse holders for the cannoneers' horses.

367. A caisson squad is organized as in paragraph 136.

368. When the gun squads march or maneuver with the battery each caisson corporal retains his post boot to boot with the lead or swing driver of his caisson.

FORMATION OF THE GUN SQUAD.

369. The gun and caisson squads are formed in double rank in the order prescribed in paragraphs 138 and 139 with an interval of 6 inches from knee to knee, and at a distance of 1 yard from the croups of the front-rank horses to the heads of the rear-rank horses.

370. In the gun squad Nos. 6 and 7 and in the caisson squad the highest numbered cannoneers in each rank act as horse holders. If there are less than six cannoneers in the squad the highest numbered cannoneer acts as horse holder, the horses being linked in single rank.

371. The guide of the gun squad is the gunner; of the caisson squad, the caisson corporal, or, in his absence, the cannoneer on the right of the front rank.

TO FORM THE GUN SQUAD.

372. The instructor indicates the point where the right of the squad is to be and the direction in which it is to face and commands: **LEAD OUT.**

The gunner repeats the command and places himself where the right of the squad is to rest, faced in the proper direction.

The men lead out and form in double rank, taking the position of stand to horse, with intervals of 18 inches between horses; each rear-rank man places his horse at the distance of 1 yard from the croup of the horse of his front-rank man, the horses covering each other.

TO MOUNT.

373. 1. Cannoneers prepare to mount, 2. MOUNT.

Executed as explained in "The Soldier Mounted" (240), the cannoneers mounting without moving their horses out of ranks; if necessary they make them give way slightly to the right or left.

If the command be: 1. Cannoneers, 2. MOUNT, the cannoneers execute at the command mount all that has been prescribed for the commands prepare to mount and mount.

TO DISMOUNT.

374. 1. Cannoneers prepare to dismount, 2. DISMOUNT.

Executed as explained in "The Soldier Mounted" (245), the cannoneers dismounting without moving their horses out of rank; if necessary, they make them give way slightly to the right or left.

If the command be: 1. Cannoneers, 2. DISMOUNT, they execute, at the command dismount, all that has been prescribed for the commands prepare to dismount and dismount.

ALIGNMENTS.

375. The alignments are first taught by requiring the cannoneers to align themselves upon two files established as a base.

The squad being in line at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few steps and establishes them as a base; he then commands: 1. By file, 2. Right (Left), 3. DRESS, 4. FRONT.

At the second command each man of the file on the right gathers his horse and at the command **dress** moves forward; when near the line each man slackens the gait, moves up slowly, casts his eyes to the right so as to see the buttons on the breast of the second man from him, sits squarely on his horse, keeps his horse straight in ranks, and touches lightly with his stirrup the stirrup of the man on his right. The other men dress in the same manner, each moving off when the preceding man halts.

The instructor verifies the alignment and gives the command **front** when the last man is aligned, at which command all cast their eyes to the front. All movement in the ranks must then cease.

The instructor observes in the alignment: That each man gathers his horse at the proper time; that he moves his horse steadily and keeps him square to the front; that he sits squarely on his horse and dresses promptly as he arrives on the line; that he does not lean his head or body to the front or rear; that he keeps the proper interval, touching lightly the stirrup of the man on his right; that he relaxes the reins and legs as soon as he has dressed.

376. In the first drills the basis of the alignment is established parallel to the front of the squad, and afterwards in oblique directions.

377. The cannoneers having learned to align themselves man by man, the instructor establishes the basis of alignment as before and aligns the squads by the commands: 1. **Right (Left)**, 2. **DRESS**, 3. **FRONT**.

At the command **dress** all the men except the base files move forward and dress up to the line.

378. Alignment to the rear is executed on the same principles; the instructor commands: 1. **Right (Left) backward**, 2. **DRESS**, 3. **FRONT**.

All the men, except the base files, rein back, keeping their horses straight, halt in line with, or a little in rear of the base, and immediately dress up to the line.

THE RESTS.

379. Executed as prescribed in "The Soldier Mounted" (258).

TO FALL OUT.

380. The squad being in line dismounted: 1. **By the right (left)**, 2. **FALL OUT**.

The front rank man on the right followed by the man behind him leads his horse 1 yard straight to the front and then directly to the stable or picket line. Each of the other front-rank men executes the same movement so as to follow the horse of the rear-rank man next on his right at a distance of 1 yard.

TO DISMISS THE SQUAD.

381. Executed as prescribed in "The Soldier Mounted" (259).

TO MARCH IN LINE.

382. Being in line at a halt: 1. **Forward**, 2. **MARCH**.

The squad moves off promptly, the guide marching straight to the front at the regular gait.

The instructor observes that the squad marches straight to the front at the regular gait; that the men keep their horses straight in ranks; that they maintain the proper interval from the side of the guide; that they yield to pressure from that side and resist pressure from the opposite direction; that while habitually keeping the head to the front, they occasionally glance toward the guide; that if in advance they rein in gradually; that if in rear they gradually increase the gait until the alignment is regained.

The instructor will impress upon the men that the alignment and interval can be preserved only by uniformity of gait and by keeping the horse straight in the line of direction.

To call attention to the loss of alignment or interval the instructor commands: **DRESS**. At this command the men glance toward the guide and then make the necessary correction.

383. Marching in line, to effect a slight change of direction: **Incline to the right (left)**.

The guide turns his horse slightly to the right and marches in the new direction; the other men gradually conform to the movements of the guide, increasing or diminishing the gait according as the change is toward or opposite the side of the guide.

TO HALT.

384. 1. Squad, 2. HALT.

TO REIN BACK THE SQUAD.

385. Being in line at a halt: 1. Backward, 2. MARCH.

All the men rein back, dressing on the guide.

This movement is used for short distances only.

TO OBLIQUE IN LINE.

386. 1. Right (Left) oblique, 2. MARCH.

At the command march each man obliques to the right (305), his right knee in rear of the left knee of the man on his right. The squad moves in the new direction, regulating by the right, in a line parallel to the original front.

If the command halt be given while marching obliquely the men halt faced in the direction in which they were marching.

To resume the oblique march: 1. Forward, 2. MARCH.

While obliquing, to resume the march in line: 1. Left (Right) oblique, 2. MARCH.

TO TURN AND HALT.

387. Being in line: 1. Squad right (left), 2. MARCH, 3. FRONT.

At the command march the front-rank man on the right executes by the right flank and halts; each of the other men turns his horse to the right, approximating the oblique and moving by the shortest line without changing the speed, places himself abreast of the pivot man. The rear-rank men conform to the movement of the front rank and place themselves, covering their file leaders at a distance of 1 yard. All dress to the pivot without command.

The instructor verifies the alignment from the pivot.

Squad half right (half left) is executed in the same manner; the pivot makes an oblique to the right.

TO TURN AND ADVANCE.

388. Being in line at the halt or at the walk: 1. **Right (Left) turn,** 2. **MARCH.**

The front-rank man on the right executes by the right flank and moves forward in the new direction without increasing the speed; each of the other men turns his horse to the right, approximating the oblique, and, moving at the trot by the shortest line, places himself abreast of the pivot man, when he takes the gait and direction of the latter. The rear-rank men conform to the movements of the front rank and place themselves, covering their file leaders at a distance of 1 yard. During the turn the guide is, without command, on the pivot flank; the original guide is resumed without indication as soon as the turn is completed.

If marching at the trot the pivot man continues at the trot, each of the others slightly increases his speed until he arrives on the line.

If marching at the gallop the execution is similar, the pivot man continues at the gallop, each of the others slightly increases his speed until he arrives on the line.

Right (Left) half turn is executed on the same principles; the pivot man makes an oblique to the right.

THE ABOUT BY SQUAD.

389. Being in line: 1. **Squad right (left) about,** 2. **MARCH.**

Executed as in paragraph 387, except that the turn is through an arc of 180°.

TO MARCH BY THE FLANK FROM LINE.

390. Being in line at a halt: 1. **By the right (left) flank,** 2. **MARCH.**

The front and rear rank cannoneers on the right simultaneously execute by the right flank; each rear-rank cannoneer, after completing the turn, closes in so as to ride boot to boot with his front-rank man. The movement is taken up successively by the other cannoneers in time to follow the two next on the right at a distance of one yard.

If marching, the men on the flank toward which the movement is made execute the turn at the command **march**; the others halt and then turn in succession.

391. The squad having been marched by the flank is now in flank column. Each cannoneer should so conduct his horse that the man of his rank who immediately precedes him shall hide all the other men in his front.

TO FORM LINE TO THE RIGHT OR LEFT FROM FLANK COLUMN.

392. 1. Right (Left) into line, 2. MARCH, 3. Squad, 4. HALT, 5. FRONT.

Executed as in "The Soldier Mounted" (**344**), each rear-rank man checking his horse so as to follow his front-rank man; the command **halt** is given at any time after the leading file has advanced its own length in the new direction. The other files dress as they arrive on the line and take the prescribed interval (**369**); the instructor places himself near the right to superintend the movement and gives the last command when all are aligned.

The instructor commands **left (right) into line** according as the flank column is right or left in front.

393. The flank column is right in front when the front-rank men are on the left of the rear-rank men; the column is left in front when the front-rank men are on the right of the rear-rank men.

TO OBLIQUE IN FLANK COLUMN.

394. 1. Right (Left) oblique, 2. MARCH.

To resume the oblique after halting: **1. Forward, 2. MARCH.**

TO CHANGE DIRECTION IN COLUMN OF TWOS.

395. 1. Column right (left), 2. MARCH.

Executed as in "The Soldier Mounted" (**350**).

MANEUVERS OF TWO OR MORE SQUADS.

396. If it is desired to train two or more gun squads mounted in the formations and movements laid down in the Gun Squad

Mounted, the squads are maneuvered by the same commands and means as those prescribed for a single squad, with obvious modifications.

TO LEAD OUT.

397. The cannoneers lead out by squads in the order of the numbers of their sections. At the command **lead out** by the instructor or senior noncommissioned officer present, the cannoneers of the first section lead out as already explained; the leading cannoneer of each of the squads moves off in time to follow the last cannoneer of the preceding squad and places his horse 15 yards to the left of the front-rank horses of his squad. If desired, this interval may be diminished.

TO POST SQUADS AT THEIR CARRIAGES.

398. The squads are marched to the park in flank column or column of squads; each gunner, on arriving near the park, marches his squad to its carriage and posts it in its position.

TO LEAVE THE PARK.

399. The squads are marched by the flank as prescribed for a single squad mounted; the rear squads, if necessary, take the trot at command of their gunners in order to close up to the proper distance.

Section 13. The Driver.

PRELIMINARY INSTRUCTION.

TERMS.

405. The horses assigned to a single driver are called a pair; the horse on the left side is called the **near horse**; the other the **off horse**. The driver rides the near horse.

The pairs assigned to the traction of a single carriage are called collectively a **team**. A team usually consists of not less than three pairs. The leading pair is called the **lead pair**; the one attached to the carriage the **wheel pair**; the pair between

these two the **swing pair**. When there are two pairs between the lead and wheel pairs, the pair next behind the lead pair is called the **lead swing**; the other the **wheel swing pair**. When there are five pairs the one between the lead swing and the wheel swing is called the **middle swing pair**.

NOMENCLATURE OF HARNESS.

406. The instructor, using a harnessed pair or a hitched team, points out the different parts of the harness, explains the purpose of each, and instructs the drivers in the correct nomenclature as given in the Handbook.

Each driver is required to become expert in taking the harness apart and in quickly and correctly assembling it.

DISPOSITION OF THE HARNESS.

407. In garrison.—The harness is arranged on two pegs on the heel posts, as follows:

On the upper peg: Both bridles hung from the peg by their headstalls; the traces of both horses hung over the peg close to the heel post; the off saddle with its attachments over the seat; the blanket across the saddle; both collars, unlocked, over the blanket.

On the lower peg: The near saddle and blanket arranged as prescribed for the off harness.

The neck yoke, with martingales attached, is hung from a spike driven into the side of the heel post.

To prevent injury to the off saddle when the blankets are out drying, the sack is put over the harness and the collars are then placed across the sack.

If the harness pegs are on the left heel post as the driver faces the manger, the saddles are placed with the cantles against the heel post; if the pegs are on the other side of the stall, the pommels are placed against the heel post.

408. In the field.—The pole prop is placed under the end of the pole. The wheel traces are detached from the collars only and laid back on the footboards. The remainder of the harness of the near-wheel horse is placed on the pole next to the double-

tree, arranged as follows: The saddle with its attachments over it, the blanket across the saddle, the bridle and collar over the blanket. The remainder of the off-wheel harness is placed next, then the swing, and lead harness in the same order. The traces of the swing and lead harness, folded once, are placed across the saddle. The neck yoke is placed on the footboard.

409. In entraining.—The harness belonging to a single pair is placed in a harness sack in the following order: Neck yoke; collars, one in each end of the sack; bridles, one inside of each collar; traces looped around and outside of the collars; blankets, one on each collar; saddles, one on each blanket. The harness sack is securely tied and tagged to show (1) the pair in the team (2) the carriage, (3) the section.

When harness sacks are not taken, each horse's harness may be packed in a grain sack and appropriately tagged.

HARNESSING AND UNHARNESSING.

410. In the training of recruits the men are first permitted to watch the instructor or an assistant perform in detail all the various steps in harnessing and unharnessing, during the progress of which every point is carefully explained to them. After this, the instructor calls upon the recruits in turn to perform a single detail of the harnessing or unharnessing, as in this way they are enabled to observe and profit from each other's mistakes. A pair of quiet, well-trained horses in a double stall is then assigned to each recruit to harness and his work is carefully supervised by the instructor or an assistant.

To avoid striking, frightening, or spoiling the horses the men are impressed with the necessity of working about them gently and quietly and of handling the harness carefully.

TO HARNESS.

411. The harness being on the heel posts, the instructor causes the men to stand to heel (226); and commands: 1. **By detail.**
2. **HARNESS.**

Collar.—At this command each driver puts on and locks the collar of his off horse, then that of his near horse. To avoid pinching and clamping a portion of the skin or mane between the

collar and the collar pad, the collar is placed well up on the neck, locked, and then lifted gently to its position against the shoulders. By stooping down and looking at it, the driver should satisfy himself that the buckle latch is securely locked.

Saddle.—He puts on the blanket of the off horse, then the saddle with its attachments, taking care not to displace the blanket; buckles the collar strap to the saddle; turns back the back strap and, in the case of wheel drivers, the breeching, fastens the crupper and completes the saddling (228). He then saddles the near horse in like manner.

Traces.—He lays the middle of the traces of the off horse over the horse's back, behind the saddle, toggles on opposite sides, and, beginning with the off trace, passes the toggles through the trace loops from the rear and attaches them to the hame tugs on the collar. The traces of the near horse are then attached in the same manner. The rear ends of the traces are left hanging over the backs of the horses.

When the horses are harnessed for drill by pair, the traces, at the direction of the instructor, are either not attached or are toggled up by passing each trace over the back behind the saddle and slipping the ring of the trace chain over the toggle which attaches the opposite trace to the hame tug.

Bridle.—He bridles (234) first the off horse, passing the reins through the roller, and then the near horse.

Unless otherwise instructed, the halters are removed before bridling.

Couple.—He turns his pair about so as to face the stable driveway and attaches the hook at the end of the coupling rein to the right pommel ring of the near saddle. He then stands to horse (237, 425).

Yoke.—The wheel driver takes down the neck yoke; places himself between his horses, facing in the same direction with them; fastens the breast strap of the off horse, then that of the near horse; passes the martingale of the near horse between the forelegs, through the standing loop on the cincha; attaches the hooks at the end of the side straps to the martingale D ring; secures the martingale of the off horse in the same manner; then passes out in rear of the near horse and stands to horse.

412. To harness without detail: **HARNESS.**

TO UNHARNESS.

413. 1. By detail, 2. UNHARNESS.

Unyoke.—At this command the wheel driver passes between his horses from the rear, unhooks the martingale of his near horse, and draws the martingale through the standing loop on the cincha; then does the same with respect to the off horse; unhooks the inside end of each breast strap, detaches the neck yoke, and hangs it on its spike.

Uncouple.—Each driver steps in front of his pair and uncouples. If the horses are facing the stable driveway, he turns them about to face the manger.

Unbridle.—He unbridles (235) the near horse, puts the halter on, fastens the halter to the manger, and hangs the bridle on the upper peg next the heel post. He then unbridles the off horse in like manner.

Traces off.—He disengages the near trace of the near horse and lays its middle over the saddle, toggle on the near side; disengages the off trace and lays it beside the near trace, toggle on the off side; removes the traces and hangs them on their peg. In like manner he removes and hangs up the traces of the off horse.

Unsaddle.—He unfastens the crupper of the near horse and places the attachments in the saddle; unfastens the collar strap and then unsaddles the near horse (229), placing the saddle on the lower peg. He removes the blanket from the near horse and places it over the saddle, the folded edge away from the heel post. He then unsaddles the off horse in like manner.

Collar off.—He removes the collar of the near horse, then that of the off horse, and hangs them up, the near collar next to the post, the zined surfaces away from the heel post.

414. To unharness without detail: UNHARNESS.

TO HARNESS AND UNHARNESS IN THE FIELD.

415. Executed as in garrison, but in such order as to suit the disposition of the harness. Thus, the order in harnessing is: Collar, bridle, saddle, traces, couple, yoke. In unharnessing: yoke, uncouple, traces off, unsaddle, unbridle, collar off.

While harnessing and unharnessing, the horses are ordinarily tied by their halters to their carriages, as follows: The lead pair to the right wheel of the gun or caisson or to the end of the pole; the swing or lead swing pair to the right wheel of the limber; the wheel pair to the left wheel of the limber; and the wheel swing pair, if present, to the left wheel of the gun or caisson.

In harnessing or unharnessing by detail, drivers stand to heel after completing each detail of the instruction.

HARNESSING AND UNHARNESSING IN THE FIELD—RECRUIT INSTRUCTION.

(This method does not conflict with the provisions of Drill and Service Regulations, and is suggested as being suitable for the purpose for which intended.)

I. The horses being tied on the picket line, to post them at the wheels preparatory to harnessing the instructor commands: **Tie to the wheels.** Each driver unties his pair from the line, leads them to the wheels, and ties on as follows: The lead pair to the right wheel of the piece or caisson; the swing pair to the right wheel of the limber; and the wheel pair to the left wheel of the limber.

II. To harness by detail, the instructor commands: **1. By detail 2. HARNESS.** This is executed in the following order:

Collar: At this command each driver puts on and locks the collar of his off horse, then that of his near horse. To avoid pinching and clamping a portion of the skin or mane between the collar and collar pad, the collar is placed well up on the neck, locked, and then lifted gently to its position against the shoulders. By stooping down and looking at it, the driver should satisfy himself that the buckle latch is securely locked.

Bridle: Each driver hangs his near bridle over his left shoulder, passing his left arm between the cheek pieces, the reins being folded over the crownpiece; takes the off bridle in his left hand and bridles the off horse, first passing the reins over his head. The near horse is then bridled in a similar manner.

Saddle: Each driver saddles his off horse, and then his near horse. After saddling the off horse, the roller on the off bridle

rein is fastened into the snap on the pommel of the off saddle. After the blanket is put on, the traces are taken off the saddle and laid on the carriage until needed. Saddling is executed as follows: Seize the blanket with the thumb and first two fingers of the left hand at the front edge of the fold, and in a similar manner with the right hand at the rear edge of the fold; hold the blanket up, arms extended, and see that the lower edges are even; then throw the outside part over the right arm. Approach the horse from the near side, place the blanket well forward on his back by throwing to his off side that part of the blanket over the right arm, still holding the blanket at the middle points; slide the blanket once or twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward; put the blanket in place with the forefinger of the left hand at the withers and the forefinger of the right hand on the backbone; then remove any locks of mane that may be under it and smooth out the wrinkles. Seize the pommel of the saddle with the left hand and the cantle with the right; approach the horse on the near side from the direction of the croup and place the center of the saddle on the horse's back, the front ends of the bars about three fingers widths behind the points of the shoulder blades; fasten the collar strap to the saddle; turn back the back strap and, in the case of wheel drivers, the breeching; fasten the crupper; let down the cincha strap and the cincha; pass to the off side, adjust the cincha and straps and see that the blanket is smooth; return to the near side, run the left hand, back up, down the withers so as to raise the blanket slightly under the pommel arch, in order that the withers may not be pinched or pressed upon; then fasten the cincha, using one of the approved methods. Having completed the cinching, let down the right stirrup, then the left. The surcingle, if used, is then buckled over the saddle and should be a little looser than the cincha.

Traces: Each driver lays the middle of the traces of the off horse over the horse's back behind the saddle, toggles on opposite sides; and, beginning with the off trace, passes the toggles through the trace loops from the rear and attaches them to the tugs on the collar. The traces of the near horse are then attached in a similar manner. The rear ends of the traces are

left hanging over the backs of the horses. When the horses are harnessed for drill by pair, the traces, at the direction of the instructor, are either not attached or are toggled up by passing each trace over the back behind the saddle and slipping the ring of the trace chain over the toggle which attaches the opposite trace to the hame tug.

Couple: Each driver steps in front of his horses and snaps the end of the coupling rein into the right pommel ring of the near saddle.

Yoke: The wheel driver takes the yoke; places himself between the horses, facing in the same direction with them; fastens the breast strap of the off horse, then that of the near horse; passes the martingale of the near horse between the forelegs and through the standing loop on the cincha; attaches the hooks at the ends of the side straps to the martingale D ring; secures the martingale of the off horse in like manner; passes out in rear of the near horse, moves the pole prop from under the end of the pole and replaces it in its carrier; then stands to horse.

III. The pairs being harnessed, to post them at the carriages for hitching, the instructor commands: **PAIRS TO YOUR CARRIAGES**. Each driver unties his pair and secures the end of the halter tie rope of the near horse to the left pommel ring of his saddle and that of the off horse to the right pommel ring of the saddle. The teams are then posted, beginning with the wheel pair, followed by the swing and lead pairs.

IV. The teams being posted and the drivers standing to horse, to hook and hitch the instructor commands: 1. **DRIVERS**, 2. **HOOK AND HITCH**. Each wheel driver passes behind the near horse, places himself between his horses on the right of the pole, engages the end of the pole in the pole ring of the neck yoke, then goes behind the off horse and attaches his traces to the hame tug, beginning with the near trace. He then passes around to the rear of the carriage at a double time, and hitches the near horse, beginning with the off trace. Each lead and swing driver goes to the rear of his off horse, passing by his off side, and hooks the rear ends of the traces to the front ends of the corresponding traces of the pair in rear, beginning with

the outer trace of the off horse and ending with the outer trace of the near horse. Each driver then stands to horse.

V. The pairs being harnessed, hooked, and hitched; and the drivers at stand to horse.

1. To unhook and unhitch, the instructor commands: 1. Drivers, 2. **UNHOOK AND UNHITCH**. Each lead and swing driver backs his pair, if necessary, in order to unhook more easily. He then goes in rear of his horses, passing by the near side of the near horse, and detaches the traces of his pair, beginning with the outer trace of the near horse and ending with the outer trace of the off horse. As each trace is unhooked it is laid over the back of the horse in rear of the saddle. The wheel driver detaches his traces from the collars only and lays them back on the doubletree, beginning with the outer trace of the near horse and ending with the inner trace of the off horse, passing around the carriage at a double time after detaching the inner trace of the near horse. After the inner trace of the off horse has been detached, he places himself between his horses on the right of the pole, detaches the pole from the pole-yoke ring and lowers the pole to the ground. Each driver then stands to horse.

2. To post the pairs at the carriage wheels preparatory to unharnessing, the instructor commands: **FALL OUT**. At this command the lead pair is moved by a right about to the right wheel of the piece or caisson; the swing pair by a right about to the right wheel of the limber; and the wheel pair by a left about to the left wheel of the limber. Each driver ties both horses to the wheel by means of the halter tie ropes; the wheel driver removes the pole prop from its carrier and places it under the end of the pole. Each driver then stands to horse.

VI. The pairs being in the position just described: To unharness by detail the instructor commands: 1. By detail, 2. **UNHARNES**. This is executed in the following order:

(a) **Unyoke**: The wheel driver passes between his horses, unhooks the martingale of his near horse and draws the martingale through the standing loop on the cincha; then does the same with respect to the off horse; unhooks the inside end of each breast strap; beginning with that of the off horse; detaches the neck yoke and places it on the footboard.

(b) **Uncouple:** Each driver steps in front of his horses and uncouples them.

(c) **Traces off:** Each lead and swing driver disengages the near trace of the near horse, lays its middle over the horse's back just behind the saddle, toggle on the near side; disengages the off trace and lays it beside the near trace, toggle on the off side; then removes the traces and lays them aside temporarily. He then does the same with respect to the off horse, beginning with the near trace.

(d) **Unsaddle:** Each driver, standing on the near side of his near horse, unsaddles as follows: Unfastens the crupper and places the attachments in the saddle; unfastens the collar strap; crosses the left stirrup over the saddle; loosens the cincha strap, lets down the cincha and places the cincha strap across the saddle; passes to the off side and crosses the right stirrup and the cincha over the saddle; passes to the near side and grasps the pommel with the left hand, the cantle with the right, removes the saddle and places it on the pole as described below. The two traces, folded once, are then placed over the saddle, trace chains on the near side. He then removes the blanket as follows: Grasping it at the withers with the left hand and at the loin with the right, he pulls it off in the direction of the croup, the edges falling together, wet side in, and places it across the saddle, folded edge on the pommel. The off horse is then unsaddled in like manner.

(e) **Unbridle:** Each driver unbridles his near horse, folds the reins over the crown piece, places the bridle over his left shoulder, passing his arm between the cheek pieces. He then unbridles the off horse. Each bridle is then laid across its saddle over the blanket, bit on the off side.

(f) **Collar off:** Each driver removes the collar of the near horse, reverses it and places it over the bridle and blanket to hold them in place, the inside (zinc) surface to the front. He then removes the collar of the off horse in like manner.

The harness is placed on the pole in the same order as the pairs from rear to front. The wheel harness is placed next to the doubletree, the swing harness in front of it and the lead harness nearest the end of the pole, the near saddle of each set

being farthest to the rear. The saddles are placed on the pole, pommels to the front.

VII. The horses being unharnessed and the picket line stretched, to tie the horses on the line the instructor commands: **TIE ON THE LINE.** Each driver unties his pair from the wheels, leads them to the line and ties them on.

NOTE.—When in the field, after the collars, placed on the poles as prescribed, have been cleaned by the drivers and inspected, they will be replaced over the saddles in the normal position: that is, with the zinc surface to the inside, so as to protect the bearing surfaces from heat and dust.

ADJUSTMENT AND FITTING OF HARNESS.

416. Drivers will be thoroughly impressed with the importance of bestowing constant and unremitting attention on the adjustment and fitting of their harness. They must learn early that a horse can not properly perform his work unless he is made comfortable in well-fitted harness. If the harness pinches, galls, or otherwise causes him discomfort, his sole idea will be to escape from the annoyance or pain thereby occasioned him, and he will become fretful, nervous, and unsteady in his work. This will not only add to his own distress, through a useless expenditure of strength and nervous energy, but by rendering the draft of the whole team unsteady it will needlessly increase the work and fatigue of the other horses.

417. Drivers must be made to appreciate the fact that every sore, every injury, every abrasion of the skin, is due to a certain definite cause which, if removed, can produce no further effect. If ill-fitting harness has escaped the notice of a driver while his horses were at work, any injury caused thereby must not escape his notice at the next stables. Failure to discover and report such injury at once to the instructor or to the chief of section is a neglect calling for disciplinary correction.

418. Injuries due to the harness must be discovered in their very beginning and at once reported to the officer in charge of the horses. That officer then performs his duty unsatisfactorily if he lacks ingenuity and skill to modify or correct the fit of the harness so as to remove the cause of the injury.

419. It is only by constant attention on the part of all concerned—drivers, chiefs of section, chiefs of platoon, the officer in charge of the horses, and the captain—that the animals of a battery can be kept up to their work without more or less prolonged periods of enforced idleness due to harness injuries.

420. The bridle and saddle are fitted as prescribed in paragraphs 230 and 234.

The collar should fit about the horse's shoulders and neck easily and uniformly. It should freely admit the thickness of the hand between the lower part of the collar and the throat and, when pulled to one side, should admit the thickness of the fingers between the sides of the collar and the neck. A short collar chokes a horse by pressing on the windpipe; a narrow one pinches and rubs the neck. A broad collar works about and galls the shoulders. More injuries result from collars that are too large than from collars that are too small.

The final test of the fit of a collar is to observe it carefully when the horse is in draft and, at halts, to notice what effect it is having on his shoulders.

After a collar has been properly fitted to a horse it should be marked with his battery number. This is conveniently done by painting the number just above the left draft spring on the inside of the collar.

The back strap, when adjusted, should admit the breadth of the hand between it and the horse's back. If too short, the crupper will cut the tail and the saddle will be displaced.

The collar strap should not be tight; otherwise it will pull the saddle forward on the withers.

The surcingle, when used, should be buckled on the near side of the near horse and on the off side of the off horse, less tight than the girth and over it.

The hip straps should be so adjusted as to enable the breeching body to bear flat against the thighs and to rest from 12 to 15 inches below the dock. If this strap hangs too low, the action of the horse, when set into the breeching, will be interfered with; if it hangs too high, the side straps will rub the stifle.

The side straps are adjusted to cause the breeching body to bear quickly should the horse be required to check the carriage.

but not so short as to impede the animal's movements while in draft. The exact adjustment can be obtained only by watching the horse in draft, both up and down grade.

The martingale is fastened by its cincha strap to the neck yoke. The length of this fastening should be such as to permit the D ring and D ring safe on the martingale to be well through the standing loop on the cincha, thus avoiding catching and interfering with the latter when the horse is set into the breeching. The martingale must be kept smooth and soft or it will chafe the inner sides of the legs and rub the belly.

The breast straps should support the pole in a horizontal position. If the pole is too low, the effort of supporting it is increased; if too high, the martingale and neck yoke may rub the breast.

The loin straps should be adjusted so that the traces, when in draft, will be straight and without downward pull on the trace loops. Otherwise, galls on the back will result.

The traces.—The length of the lead and swing traces must depend in a great measure on the size of the horse and his stride. The rule for lead and swing pairs is to allow about 1 yard from head to point of buttocks when in draft. The length of the wheel trace is fixed, but allowance may be made for difference in the size of the horses by proper adjustment of the martingale and side straps. This will allow a minimum distance of about 14 inches between hind quarters and singletree for the average wheel horse when in draft. The traces should be adjusted by a strap under the belly or one over the saddle so that their direction shall be as nearly normal to the shoulders as possible to avoid any downward or upward pull on the collar. A downward pull on the collar will tend to gall or injure the neck, while an upward pull on it will tend to make it rise and choke the horse.

The rear trace chains of the lead and swing traces have a ring at one end and a hook at the other; the hook is passed through a "D" ring at the end of the trace and hooked back into any desired link. By this means the length of the lead and swing traces may be adjusted. Care must be exercised that the traces belonging to any one horse are of even length.

MOUNTED INSTRUCTION.

INTERVALS AND DISTANCES.

423. Intervals between—

Pairs in line, 1-horse length, 3 yards.

Teams in line, 1-team length, 3 yards for each pair.

Hitched carriages in line, 1 hitch-carriage length, 17 yards for a 3-pair team.

Distances between—

Pairs in column, 1 yard.

Teams in column, 2 yards.

Hitched carriages, about 2 yards, or such that, when moved by the flank, the intervals will be as above.

Other intervals and distances are as prescribed in "The Battery Mounted."

DISPOSITION OF THE CARRIAGES OF A SECTION.

424. The carriages of a section are said to be in **section column** when one is in rear of the other and hitched carriage distance from it. They are ordinarily parked in this formation.

They are said to be in **flank column** when abreast of each other at the interval prescribed for hitched carriages in line; in **double section** when abreast of each other at 2 yards interval.

TO STAND TO HORSE.

425. The driver takes the position with respect to the near horse prescribed for "The Soldier Mounted" (237) and also holds the coupling rein in his right hand when this is necessary properly to control the off horse. When it is held the coupling rein is not attached to the near saddle.

TO LEAD OUT.

426. To form the pairs or teams after harnessing, the instructor indicates the order in which the drivers are to leave

the picket line or stable and the place and character of the formation, and commands: **LEAD OUT**; or, 1. **First (such) section, 2. LEAD OUT.** The drivers, moving in the order directed and so as not to interfere with each other, lead out as explained in "The Soldier Mounted" (238). When necessary to lead or control the off horse the driver holds the coupling rein in the right hand. In such a case it is not attached to the saddle of the near horse.

If the pairs are to be led at once to the carriages the instructor may command: 1. **To your carriages, 2. LEAD OUT**; or, 1. **First (such) section, 2. To your carriages, 3. LEAD OUT.**

TO MOUNT AND DISMOUNT.

427. Being at a halt: 1. Drivers prepare to mount (dismount), 2. MOUNT (DISMOUNT).

Executed as prescribed in "The Soldier Mounted" (240, 245). The whip, if in hand, is hung on its ring before dismounting.

TO DISMOUNT THE DRIVERS WHILE MARCHING.

428. Being at a walk: 1. Drivers, 2. DISMOUNT.

Each driver dismounts without checking the gait, places the bridle reins of his near horse over the pommel, and walks beside him without touching the reins, unless it is necessary to check his pair; if either one of his pair lags, he speaks to him or touches him lightly with the whip.

If necessary to guide the carriage to a definite position, the driver takes the reins as in stand to horse and controls the movement.

If the instructor commands: 1. **Lead and swing drivers, 2. DISMOUNT,** only the drivers named dismount.

TO MOUNT THE DRIVERS WHILE MARCHING.

429. Being at a walk: 1. Drivers, 2. MOUNT.

All the drivers who are dismounted mount without checking the gait.

If the instructor commands: 1. **Wheel drivers**, 2. **MOUNT**, only the drivers named mount.

Marching with the drivers dismounted will be practiced at first over smooth, level ground until the teams are taught to pull together and to walk with an even, regular gait.

ALIGNMENTS.

430. Being in line of pairs, teams, or sections, unhitched, and at a halt, the instructor sees that the driver, team, or section on the flank toward which the alignment is to be made is in the desired position and commands: 1. **Right (Left)**, 2. **Dress**, 3. **FRONT**.

At the command dress the other drivers look to the right and align themselves accurately, keeping their pairs straight and preserving their intervals. At the command front they turn their eyes to the front.

The instructor may place himself on either flank and give a general alignment by ordering any driver to move one or both of his horses forward or backward.

If the teams are hitched the alignment is made as prescribed in "The Battery Mounted" (547).

GUIDES.

431. When two or more pairs, teams, or carriages march in line the instructor, as soon as the march in line has begun, designates the element on one flank or the other as the guide of the movement, thus: **Guide right (left)**. The other elements align themselves on the guide thus indicated and maintain their intervals from that flank.

If marching in column of pairs, teams, or carriages, or if marching obliquely, the leading element is without indication the guide of the movement.

The guide of a team or carriage is its lead driver. The guide of a section in section column is the guide of its leading carriage; in double section, the guide of its left carriage.

The guide is responsible that the direction and rate of march are properly maintained.

RESTS.

432. The rests are executed and the attention resumed as in "The Soldier Mounted" (253).

When dismounted the drivers remain close to their pairs so as to keep them in place, and are required:

1. To raise the collars and examine the shoulders for injuries, reporting any discovered. The collars may be unsnapped and laid back on the saddle.

2. To rub the hand over the bearing surface of the collar to see that it is clean and smooth.

3. With a cloth to wipe the perspiration, if any, from the bearing surface of the collar and from the shoulders.

4. On marches, or when the draft has been such as to cause steady and constant pressure against the shoulders, to restore and stimulate the circulation in them by hand rubbing, being careful on finishing to leave the hair lying smooth and flat.

5. To look after and adjust such parts of the harness as need it (420).

6. In addition, if a wheel driver, to relieve the weight on the necks of his horses by properly placing the limber or pole prop; on muddy roads to wipe the mud off the martingales.

TO HOOK TRACES.

433. The teams being in column of pairs in proper order from front to rear, the instructor commands: **HOOK TRACES.**

Each lead and swing driver goes to the rear of his off horse, passing by his off side, and hooks the rear ends of the traces to the front ends of the corresponding traces of the pair in rear, beginning with the outer trace of the off horse and ending with the outer trace of the near horse.

TO UNHOOK TRACES.

434. **UNHOOK TRACES:** Each lead and swing driver backs his pair, if necessary, in order to unhook more easily. He then goes in rear of his horses, passing by the near side of his near horse and detaches the traces of his pair, beginning with the outer

trace of the near horse and ending with the outer trace of the off horse. As each trace is unhooked it is laid over the back of the horse in rear of the saddle.

TO POST THE TEAMS WITH THEIR CARRIAGES.

435. The teams, with traces hooked or unhooked, may be marched to their carriages in column, double-section column, or other suitable formation. As they approach the carriages the instructor commands: **TEAMS TO YOUR CARRIAGES.** At this command each team proceeds by the most direct route to its carriage, turning if necessary, and approaching it from the right or left limber wheel. When the team reaches its proper position the wheel driver commands: 1. Team, 2. **HALT**, causes the horse nearest the pole to step over it, and places his pair for hitching.

TO HITCH.

436. The traces being hooked: 1. Drivers, 2. **HITCH.**

Each wheel driver dismounts, if mounted; passes behind the near horse; places himself between his horses, on the right of the pole; engages the end of the pole in the pole ring of the neck yoke; then goes behind the off horse and attaches his traces to the singletree, beginning with the near trace. He then passes around the rear of the carriage at double time, and hitches the near horse, beginning with the off trace.

He then mounts, if mounted when the command was given; if dismounted, he stands to horse.

437. If cannoneers be present the instructor may command: 1. Cannoneers, 2. **HITCH.**

The cannoneer posted nearest the left wheel of the limber engages the end of the pole of his carriage in the pole ring of the neck yoke and then hitches the near wheel horse; the cannoneer posted nearest the right wheel of the limber hitches the off wheel horse. The traces nearest the pole are fastened first.

TO UNHITCH.

438. 1. Drivers, 2. **UNHITCH.**

Each wheel driver dismounts, if mounted; detaches the traces of his near horse, beginning with the outer one; passes around

the rear of the carriage at double time and detaches those of his off horse in like manner; passes between his horses, disengages the pole from the pole ring of the neck yoke, and lowers the pole to the ground. He then mounts, if mounted when the command was given; or stands to horse, if dismounted.

The ends of the traces are passed over the horse's back behind the saddle or are secured to the breeching body, as may be directed by the instructor.

439. If cannoneers be present the instructor may command:

1. **Cannoneers**, 2. **UNHITCH**. The cannoneer posted nearest the left wheel of the limber unhitches the near wheel horse, disengages the pole of his carriage, and lowers it to the ground. The cannoneer posted nearest the right wheel of the limber unhitches the off wheel horse. The outer traces are disengaged first.

The ends of the traces are secured as prescribed in the preceding paragraph.

TO DISMISS THE DRIVERS.

440. The drivers being in line of pairs, teams, or sections, at stand to horse, with teams unhitched and traces unhooked: 1. **By the right** (left, or, right and left), 2. **FALL OUT**.

If in line of pairs the movement is executed by each pair as prescribed for each rider in "The Soldier Mounted" (259). If in line of teams or sections the leading driver on the right executes the movement as before, being followed at 1 yard by the remaining drivers of his team or section. The movement is then successively executed by the remaining elements of the line.

If the instructor commands: **FALL OUT**, each driver leads his pair directly to its stall or to its place for unharnessing.

441. As soon as the drivers have secured their horses at the place for unharnessing, the instructor commands: **UNHARNESS**; or, 1. **By detail**, 2. **UNHARNESS**.

The harness is removed, cleaned, and properly put in place the horses are rubbed down and cared for. Having satisfied himself by inspection that these duties have been properly performed and that all the precautions required on return from

exercise have been observed, the instructor causes the harness to be covered. The men fall in, and are marched to the battery parade ground, and dismissed.

MANAGEMENT OF THE PAIR.

442. The near horse is managed as explained in "The Soldier Mounted"; the off horse by the bridle reins and the whip. The voice, used quietly in connection with the whip and the aids, is of especial service to the field artillery driver in the management and control of his pair.

443. The whip is habitually used in driving field artillery teams. However, it will cause much harm and little good unless drivers are thoroughly instructed in and made to understand its correct use. It must never be used with a full-arm swing and never about the head or neck. It should be applied by a simple motion of the wrist, and, like the leg aids, should commence with mild, gentle taps which are gradually increased in their severity until obedience is obtained, when its action must cease. If applied in such manner as to cause the horse to jump or jerk into the collar, it becomes a fruitful cause of sore shoulders, broken harness, and balky horses. The horses should not be afraid of the whip. A reliable indication that a pair has been driven by a soldier who understands the proper use of the whip is that the horses permit head, ears, and neck to be stroked with it, and show no sign of nervousness or fear when it is brandished around their heads or over their necks.

The whip, applied by gentle taps on the left shoulder of the off horse, should cause him to move his forehand to the right; applied on the right shoulder, it should cause him to move his forehand to the left; applied on the near side slightly in rear of the place for a rider's legs to act, it should cause him to move his haunches to the right; applied similarly on the off side, his haunches should move to the left; applied behind the saddle, on the croup near the right hip, it should cause him, while remaining close to his mate, to move straight to the front.

While driving, the whip is habitually carried hanging from the right wrist. At ceremonies it is carried so as to point obliquely to the left front over the driver's left forearm.

Drivers must be forbidden to use the lash of the off bridle as a whip.

444. The voice, because it is independent of the sensibility of the horse's mouth and sides, because its signals are quickly learned, easily recognized, and smoothly obeyed by the horse, and because it requires no great amount of skill in its correct use, is an aid of great value to the driver.

Like the other aids, it must cease to act when obedience to it has been obtained. It must be reserved for occasions when it is needed to produce a definite effect. Monotonous and continuous use soon renders it meaningless.

It is proper to make use of the voice in the following ways:

(a) A low, quiet chirrup or cluck, in connection with the aids and the whip, to attract attention and move the horses to the front or to increase their gait.

(b) A low, quiet **whoa** used in connection with the rein and leg aids to steady the horses, to decrease their gait, or to stop them.

(c) Gentle, quiet, reassuring tones to calm a horse when frightened or when patting his neck or otherwise rewarding him. Used with the chirrup or cluck at the moment a pair shows a disposition to hesitate or stop, they are the best possible aid in encouraging them and keeping them in the collar in a heavy or difficult pull.

(d) A harsh, angry, scolding tone shouted at a horse when he is doing something wrong, for example, kicking. So used, the voice frightens or startles him and makes him stop his wrongdoing.

Shouting or yelling, except as indicated in (d), must not be tolerated in the management of horses.

445. The bridle reins of the off horse are used in gathering him, for steadying him, for checking his gait, for halting him, and for reining him back. They are habitually carried in the left hand, so held as to maintain gentle contact.

When necessary to use the bridle reins of the off horse with some force, the driver draws them toward his right thigh, using his right hand, still holding the lash in his left hand. The roller, fastened to the saddle, changes the direction of the force

applied and serves to transmit an equal tension to both reins. Unless the off horse is well trained and prompt in conforming to the movements of the near horse, the driver must frequently make use of the direct rein in controlling him; thus, he may reach over and feel the right rein in order to turn his head to the right and induce him to step into a turn in that direction. The coupling rein may properly be used to lead the off horse into a turn to the left, but it must never be used to check his gait. Its use for this purpose has the effect of pulling the head in, preventing the horse from traveling squarely, and causing galls and injuries on his outside shoulder. Off horses that are too free and have the tendency to rush forward until the head and neck are drawn in by the coupling rein are most easily and effectively driven on a short coupling rein and the right direct rein. For this purpose the bridle rein as issued should be replaced by one made so that it may be passed from the right ring of the snaffle up through the roller and thence to the left ring of the snaffle.

446. Both horses should be gathered before moving from a halt, before halting, and before changing gait or direction, the near horse as explained in "The Soldier Mounted" (297), the off horse by a slight pressure or a slight additional pressure on the bit. The near horse is then required to move in the desired manner or to halt, while the off horse, by the use of the reins, whip, or voice, as may be necessary, is made to conform to the movement. By kind and gentle treatment the two horses must be accustomed to work together evenly and to effect changes of gait and direction simultaneously. The off horse must neither crowd the near horse nor travel too widely from him. In all movements involving a change of direction the horse on the outside of the turn, having the longer circumference to pass over, must quicken his movements slightly; but in order that when hitched the draft during the turn may be kept as even as possible he should be held behind the inside horse and be brought abreast of him only when the turn has been completed and the straight-ahead movement in the new direction begun. The driver causes the horse on the inside of the turn to move over the arc of a circle whose radius is 6 yards.

447. Drivers are instructed in managing and maneuvering a single pair before their training with teams hitched and in draft is begun. The instructor, employing commands similar to those used in "The Soldier Mounted," causes the drivers to move their pairs forward, to the flank, to the oblique, or the about; to execute changes in gait, or to halt; to align themselves; to pass from line to column or column to line; to rein back; to execute circles; to side step; in short he causes them to execute any movement (212) which in his judgment is of value in teaching the driver and in giving him practice in the control of his pair.

448. The next step is to form the drivers in column of three or four pairs, with traces unhooked, and to teach them the commands and movements they are to obey and execute when the team is hitched and maneuvered as a section. In this instruction the drivers are frequently changed about so as to drive, lead, swing, or wheel pairs; thus teaching them responsibility for guides, distances, and intervals, and impressing upon them the necessity for attentive cooperation in order to develop intelligent and efficient teamwork. This is a most favorable formation for teaching all the movements employed by a section as a part of "The Battery Mounted," together with the commands and signals therefor.

449. This instruction by pair is then followed by the same exercises with traces hooked but with teams unhitched. It is ruinous to draft efficiency, and spoils the training of draft horses, when a driver is hesitating, uncertain, or ignorant of a movement, since this leads him to start or check his pair, to swerve this way or that, or otherwise to work against or interfere with the other drivers in his team. It is therefore of utmost importance that drivers, while undergoing instruction prescribed in this and the preceding paragraphs, learn and become thoroughly familiar with every movement used by the section in "The Battery Mounted." When this is accomplished and when they thoroughly understand how to direct and hold their horses in a turn, and how to direct and control them in limbering, the drivers are ready to take up the management of their horses in draft.

TEAMS AND THEIR MANAGEMENT IN DRAFT.

450. The mobility of a battery of field artillery depends to a great extent upon its draft efficiency. This can be attained only by a thorough understanding and a correct application of sound principles on the part of officers, noncommissioned officers, and drivers. If the driving is not good, neither quick maneuver, long marches, nor efficient transport service can be assured.

TEAMING OF ARTILLERY HORSES.

451. The weights behind teams are established on the assumption that each horse does his full share of the work. This is impossible unless the driving is of a high order; such driving is very greatly facilitated by a careful teaming of the horses. Horses possessing uniformity in temperament, gaits, size, and conformation, which can come only with a high degree of uniformity in breeding, represent the ideal which a battery as a whole is unable even to approximate. In any battery, however, the individual teams may be made up with a fair degree of uniformity in the qualities mentioned.

To place for instance an active, ambitious, and impetuous horse in a team of slower moving, more phlegmatic animals is greatly to impair the efficiency of all; uneven draft results; the free horse is either overburdened or is fretted and taught to be a quitter, while his driver is handicapped, overworked, and exasperated.

The first consideration in teaming horses is uniformity in gait. This usually also means a satisfactory degree of uniformity in temperament. At their natural walk and trot the six or eight horses selected for a team should cover as nearly as possible the same distance in a fixed length of time. Having selected the team in this manner the horses are then paired with regard to, first, activity and temperament; second, size (height, then weight); third, conformation. The pair that is most active, or that has the freest, most willing, and most responding temperament should go in the lead; that which shows these qualities to the least degree, in the wheel. If activity and temperament

afford no choice in placing the pairs, the blockiest or heaviest pair should go in the wheel and the tallest or lightest pair in the lead.

Matching for color, though desirable for the sake of appearance, is the last consideration in teaming horses to obtain draft efficiency.

The freest moving team should be assigned to the first-section piece, the next freest to the first section caisson, the next to the second section piece, and so on throughout the battery. Then if the first section leads there will be a slight but uniform tendency throughout the battery to lose distance, while if the last section leads there will be a slight tendency to crowd.

As a general principle, horses under 7 years of age should habitually be employed as off horses; also, in any pair the horse of the better saddle conformation should be the near horse, and the freer driver the off horse. However, in any team the horses should be interchanged in order that they may be trained to work willingly in lead, swing, or wheel, and as the off or near horse in the pair.

TO START A CARRIAGE OR TO INCREASE ITS SPEED.

452. In all movements from a halt or in changing gait or direction, each driver gathers both of his horses before applying the aids or giving the signals which they are to obey.

In starting a carriage it is desirable that all the horses of the team simultaneously apply power in the collar. Though this is extremely difficult, since three or four drivers can not usually start six or eight horses at the same instant, the endeavor to do so should always be made. A good start is rendered more certain if the traces are reasonably well stretched before the team is called on to move. In stretching the traces, however, a driver must be careful not to permit his horses to bump into the collar, because such a practice tends to make them think that a bump on the shoulder means to stop. A good start is rendered certain if every horse steps slowly into the collar and holds there quietly straining at his task until the slower horses in the team overtake his motion and add sufficient strength to move the carriage. A gradual start, then, becomes of greater practical

importance than a simultaneous start. Chiefs of section and drivers have a constant tendency to start off too quickly. This evil is aggravated if the command for starting has been loud, sharp, and abrupt rather than low and prolonged. A good start is facilitated if the command of execution habitually follows the preparatory command at a fixed interval.

At the preparatory command each driver gathers his horses; at the command of execution he applies the proper aids to the near horse, touches the off horse, if necessary, with the whip, and speaks to both horses with a low cluck or chirrup, causing them to respond promptly by stepping slowly into their collars and straining until the carriage moves.

The same principles apply in increasing the speed of the carriage by passing to a faster gait. Abruptness or suddenness of movement is to be avoided.

Drivers must appreciate the necessity for cooperation, and each one must be constantly attentive to what the others in the team are doing. Each should regulate his movements on those of the pair ahead of him; the wheel driver especially must be careful that his pair does not lag behind or attempt to start the carriage alone. As an example, for the wheel driver to have his horses in the breeching when the others are in the collar is inexcusable.

When, for an unexpected reason, a driver must stop his pair or can not start it at the command he must give a warning call to the others.

TO STOP A CARRIAGE OR REDUCE ITS SPEED.

453. To the same degree that effort is made to avoid abrupt or sudden starts, so also should effort be made to avoid abrupt or sudden stops or reductions in speed. In stopping the carriage the drivers hold their horses out of traction and stop with the gradual stopping of the carriage. The wheel driver may, when desirable, assist in stopping the carriage by holding his horses back in the breeching. The brake, if carefully and gradually applied so as not to jerk the horses, is of great use in stopping the carriage or checking its speed. The lead and swing drivers regulate the movement of their pairs by those of the wheel pair, keeping out of the way, but avoiding any strain on the traces.

TO BACK A CARRIAGE.

454. The wheel driver is responsible for backing the carriage. The other drivers must give him complete liberty of trace. Both horses are reined back together, quietly and steadily according to the principles outlined in "The Soldier Mounted" (307).

TURNS.

455. Turns are made to the right or left through angles of 45° (the oblique), 90° (by the flank), or 180° (the about). In all of these turns the lead driver directs his pair so that the horse on the inside of the turn moves over the arc of a circle whose radius is 6 yards. It is desirable that all the horses of the team remain in draft during the turn. When this is the case there is a constant tendency for the line of traction to become the chord of the circle over which the lead driver is moving, and for all horses to make the turn on two tracks on the haunches. In order that the turn may not be too short, forcing some of the horses to step directly to the side and perhaps step on each other or knock their legs, all drivers must combat this tendency by keeping their horses directed toward the outer circumference of the turn. This is accomplished in a satisfactory manner if each driver keeps his horses set and going as if to make his horse on the inside of the turn move up between the horses of the pair next in front. In this manner each pair will describe a circle which is only slightly smaller than that described by the pair next in front; the abruptness of the turn on the haunches will be reduced and the turn rendered easier.

If the outside horses were held accurately abreast of the inside ones during the turn, the only trace in draft would be the outer one of the outside lead horse. To avoid this and to keep all the horses in draft, it is necessary for the lead and swing drivers to hold their outer horses a greater or less distance behind the inner ones. The amount of this depends upon the radius of the turn and the position of the pair in the team. It is greatest with the lead pair, and diminishes progressively with each pair to the rear. In the wheel pair, however, the outside horse should be ahead of the inside horses as much as

is allowed by the doubletree. The horses are brought abreast of each other only when the turn is completed and the whole team straightened in the new direction.

In executing the turns at an increased gait the radius is sufficiently increased to permit the horses to execute the movement with ease and the gait is moderated when necessary to avoid overturning the carriages.

THE TURN IN LIMBERING.

456. As the team arrives in close proximity to the carriage to be limbered it moves at a walk, at the command, when necessary, of the lead driver. The lead and swing drivers hold their horses back so that the wheel driver has complete liberty of trace. As the lead driver passes the lunette he starts to move his pair so that the inside horse passes over the arc of a small half circle, radius approximately 3 yards, diameter in continuation of the trail of the carriage. The other drivers advance to make the turn on exactly the same ground, the whole team moving so that the limber wheel will pass within about 1 foot of the lunette. When the axle of the limber is nearly in line with the trail the wheel driver commands: 1. Team, 2. **HALT.** At this command the lead driver slowly straightens his pair in direct prolongation of the trail, and the swing and wheel drivers follow his movements by slowly passing their horses toward the same line. When the horses are straight on this line the turn, if properly made, should have placed the pintle of the limber in prolongation of the trail. The wheel driver then backs the limber as much as may be necessary to permit limbering.

Throughout the movement it is essential that the traces of the lead and swing pairs remain loose. They are stretched out the moment the limbering is completed.

TO CONFIRM IN HORSES A WILLINGNESS TO PULL.

457. Almost any horse can be trained to be an honest and willing puller. Through ignorance, lack of judgment, bad management, or laziness on the part of the driver he can far more

easily be trained to be a shirker and a quitter. A horse will not pull freely or willingly if to do so causes him pain. It is essential, therefore, that his harness, especially his collar, fit him with absolute comfort; that his shoulders be hardened through careful conditioning and rational work and are therefore not tender or sore; and that he apply his weight in the collar slowly and gradually, without sudden starts or jerks that would pound and bruise his shoulders. Even though all of the above conditions be favorable, a horse will not pull unless he is confirmed in the belief that when he applies his strength the load behind him will yield. Thus a willing horse may be hitched to an immovable object and within a few minutes, especially if he be yelled at or whipped, be transformed into a sulker and a balker that only long, patient, and careful handling will cure. To allow repeated trials and failures in pulling is the quickest and most effective method of ruining the draft efficiency of any team. It must be borne in mind that there is a limit to the draft power of any artillery team and that this power, due to the tandem method of hitching, is, even with perfect driving, from 20 to 50 per cent less than the sum of the powers of the individual horses. A team should never be given deliberately a task that is clearly beyond its strength. It is right and proper, in order to train a team and to develop its draft power to a maximum, to give it from day to day or week to week tasks that gradually increase in difficulty. Such tasks will occasionally stop the team. No evil results will follow if the animals, when so stopped, are permitted to rest quietly for a few minutes and recover their wind. The first tendency of the inexperienced noncommissioned officer or driver when a team stops is to urge it forward immediately. This is exceedingly wrong. The horses are either taking an absolutely needed rest or are showing by their action that they need assistance. While the horses are resting a sufficient number of cannoneers with drag ropes should be brought up so that when the signal to move is given the carriage will certainly move. Such a practice trains the horses that there is no such thing as failure or defeat in a pull and therefore confirms a willingness to pull whenever they are called upon to do so. A team so trained may, when it has become hardened to its work, be called on to make

the attempt to pull out of a difficulty unaided unless such a task is clearly beyond its strength. However, if the attempt fails it must be appreciated that the team to a certain extent has been injured and that for some time to come it must not again be subjected to the risk of failure. A team, trained and managed in accordance with these principles, can always be counted on to occasion a minimum of delay to a battery which encounters difficulties in transport.

DRIVING UP STEEP SLOPES AND OVER DIFFICULT GROUND.

458. In order to exert his maximum strength when in a difficult pull, the draft horse must get the greatest possible weight forward and into the collar. By maintaining a low, extended, and advanced carriage of the head and neck he is able to add considerably to his power of traction. He should, therefore, be allowed full freedom of rein when in a heavy pull and not be forced to fight the driver's hand. Because a horse can exert a greater power of traction when ridden, it is often advantageous when in a difficult pull to mount cannoneers on the off horses. When pulling up a hill the drivers should lean well forward and should encourage their horses by a low and quiet use of the voice.

The most favorable gait for heavy pulling is a steady, uniform walk, with every horse straight in his collar and the team straight from lead to wheel. The tendency to rush a hill or other difficult pull must be avoided. Any increase of speed for such a purpose can not be taken up with perfect uniformity by all the horses of a team and the footing for each horse is rendered more uncertain and difficult. This causes undue weight to come upon the shoulders of some while none at all may be borne by others. Uneven draft quickly results, often to the point of stalling the team. In going over a V-shaped ditch unusual effort should be made to keep the horses at a steady walk. In such a place the brake must be used with great care, so that the traces will be tight and the horses in draft during the entire crossing. The brake should be released a little too late rather than too soon, for, in the latter case, the carriage rushes forward into the bottom of the ditch, where it stops, and the horses on again coming into draft are given a violent jerk.

When manœuvering off the road, steep ascents should be taken in line to avoid checks. When on a road or track, if circumstances permit, the battery should be halted at the foot of the hill and carriages or sections sent up at about one-minute intervals. This gives opportunity for the teams to be halted to rest and blow at the top, or, if the hill be a long one, to be halted a number of times during the ascent. Each carriage or section, after such a halt, moves out in time for the carriage or section which follows to halt on the same ground. Cannoneers, instructed to follow and watch a carriage in difficult draft, may by applying their strength at the moment a stop seems imminent, prevent the carriage from stalling.

When a carriage has been stalled it may, in some cases, be found best to have cannoneers first back it for a few feet, in order to put both horses and carriage on more advantageous ground from which to make the start.

459. Cannoneers should be instructed and regularly practiced in assisting the horses by working at the wheels and along ropes attached to the carriages. Much delay and confusion on the march may be avoided by such training. To avoid interference and to insure teamwork, attention should be given to the spacing of the men along the rope. Ropes may be attached in the following ways:

(a) For ordinary pulls.—By a running bowline or a clove hitch around the trail of the carriage, well back near the breech of the gun.

(b) For a short, hard pull, as in lifting a carriage out of a ditch.—By a wheel purchase. To use a rope as a wheel purchase: With one end a turn is taken around the fellow as near as possible to the ground; the rope is placed over the short end so as to hold it against the tire, and is then laid on the tire and passed over the wheel to the front. The rope should be so placed around the fellow that it may be pulled clear of the wheel when the short end is released by the turning of the wheel. Should the wheel slip, a rope may be wound around the fellow and tire with turns about a foot apart to enable the wheel to get a grip.

(c) For use without teams or when it is desired to use the team in advance of its regular place.—By passing the hook end of one rope and the ring end of another under the doubletree of

opposite sides of the pole, and hooking together above the pole in rear of the doubletree. With each rope a half hitch is taken around the pole near its end. These ropes may be extended to any desired length by others, and either attached to a limber, in case it is desired to use a team, or used with cannoneers. This method is useful in crossing dangerous bridges and on steep slopes where horses can not get good footing or can not maintain uniform draft.

460. When a carriage is mired it may be pulled out by attaching it with ropes to the middle point of a log or balk. Each end of this balk is attached to the pintle of a limber. A full or extended team is hitched to each limber. The balk acts as a giant doubletree between the two limbers, and with careful driving the draft will be very even.

461. The start of a stalled carriage may at times be facilitated by turning the pole either to one side or the other as far as it will go and straightening the team in that direction. In this way the first effort of draft serves only to turn the mass of the weight about a vertical axis, with the trail as the lever arm. The yielding obtained in this way encourages the horses and brings the total weight into their collars more gradually.

462. In a heavy pull a driver should always watch the traces in front. Should they become loose, he very gradually holds his own pair back until they tighten up and the horses to the front again come in draft. The whole team may then, if necessary, be urged forward a little faster. This method insures all the horses coming into draft without the jerk, so disconcerting to the whole team, that frequently results when a pair is brought into draft by being urged forward at increased speed.

463. Carriages should be driven squarely across sunken roads, ruts, narrow ditches, etc., so as to avoid whipping the pole.

Section 14. Rules for the Care of Horses.

591. All drivers and all individually mounted men will be taught and must thoroughly understand the following rules for the care of horses:

Horses are nervous animals, and for that reason require gentle and quiet treatment. Docile but bold horses are apt to

retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals.

Before entering a horse's stall and when coming up behind him speak to him gently, then approach quietly and without sudden or abrupt movement.

A horse must never be struck or threatened about the head. Such treatment quickly makes him head shy and renders his proper control difficult and exasperating.

Never kick, strike, or otherwise abuse a horse. On rare occasions punishment may be necessary, but it must be administered immediately after the offense has been committed, and then only in a proper manner with whip or spur and never in the heat of anger.

Before taking a horse out carefully examine him to make sure that he is fit for work.

1. See if he has eaten his food, especially his grain.
2. See if his breathing is normal; that is, quiet and without distended nostrils.
3. See that he is not resting a fore leg, a sure indication that something is wrong with it.
4. Note whether his droppings are normal.
5. Look him over, especially on the back and the shoulders, to see that there are no sores, lumps, or injuries to be rubbed and irritated by harness or saddlery.
6. Clean out his feet; see that there are no stones or nails in them; and see that his shoes are tight. A loose shoe greatly increases the concussion on the foot.
7. See if the horse goes lame on leading him out.

Give the horse an opportunity to drink before leaving the picket line or stable and before putting the bit in his mouth.

In cold weather warm the bit by blowing and rubbing it before putting it in the horse's mouth.

In taking a horse out, always walk him the first mile to start the circulation in his legs. Habitual disregard of this rule leads to foot and leg troubles that will render the horse unserviceable before his time.

Always walk the last mile, or farther if necessary, to bring the horse in cool and breathing naturally.

To be certain of no ill effects, a horse brought to the stable in a heated condition must be cooled out and dried before he is left tied up in his stall. To cool the horse walk him about slowly under a blanket if the air is chilly. Occasionally interrupt the walking by giving him a good brisk rub-down and two or three swallows of water. Walking is especially valuable, because this gentle exercise keeps the muscles moving slowly and so assists in working any excess of blood out of them and out of his vital organs. The brisk rubbing dries him and assists in bringing the blood back to the skin, and so aids in restoring the circulation to the normal. If the surface of the body becomes chilled or if the cooling out is too sudden the congestion existing in the lungs or in the feet may not be relieved, and pneumonia, laminitis, or other troubles will then result. A sudden stoppage of hard work is always bad for the feet and is very liable to result in laminitis. The water given in small quantities slowly cools the horse internally and so aids in sending the blood back to the surface and restoring the normal circulation and temperature. The cooling-out process must always be a gradual one. To throw water on any part of a heated horse is particularly dangerous.

Except as directed in the preceding paragraph, never water a horse when heated unless the exercise or march is to be resumed immediately; if the exercise or march is to be resumed at once water will be of the greatest benefit to the horse, no matter how heated he may be. But a horse should not be called upon to do fast work for at least a half hour after a big drink.

Never feed grain to a horse when heated or fatigued. Grain is a highly concentrated food that requires high digestive power. Abnormal temperature impairs the power of the digestive organs. If the animal has been worked to the point of fatigue, all bodily functions are for a time injuriously affected. For that reason he must be rested and his normal digestive power restored before concentrated food of any kind is given to him. On the other hand, hay, being a bulky food, will not hurt a horse however heated or fatigued he may be.

Never remove the saddle and blanket in such a way as to expose a wet back either to the hot rays of the sun or to a

sudden cooling. The pressure of the saddle restricts the blood supply and so weakens the tissues of the back. In this condition a hot sun more readily burns or inflames the skin, while a sudden cooling contracts the blood vessels and prevents the proper return of the blood to nourish the tissues. In either case sores and swellings may result.

When the saddle is removed the back should be promptly rubbed and massaged to dry it and restore the circulation. If this is impossible the next best thing is to replace the blanket with the dry sides next to the skin and again put on the saddle, girthing it loosely.

After a long or hard march it is necessary to restore the circulation in the back very gradually, or sores and swellings are liable to result. To do this the girth should be slightly loosened and the saddle allowed to remain on the back for 15 or 20 minutes. The more gradually the circulation can be restored, the less severe will be the pain and swelling.

In hot weather, especially on the march, it is very refreshing to the horse to have his eyes, nostrils, dock, and the inside of his hind quarters sponged with cool water.

When the horse comes in wet with rain he should be scraped, then blanketed, and his head, neck, loins, and legs rubbed. If the weather is cold an extra blanket should be put on for 20 minutes. The wet blanket should be changed when the horse dries.

Do not wash the legs. This practice is one of the surest means of causing scratches. The legs should be rubbed dry and bandaged loosely with thick bandages. Strips of gunny sacks are satisfactory for this purpose. It is far more important to have the legs warm and dry than clean. The best method of treating muddy legs in order to avoid scratches is to bandage them to keep them warm until they are dry and then brush them clean.

Never leave a horse for the night until he is thoroughly clean, especially around his legs, pasterns, and feet.

Individual men returning from mounted duty or pass will report their return to the stable sergeant, who will inspect each horse and see that he is properly cared for.

. FEEDING.

596. Three principles should be adhered to in feeding:

1. Water a thirsty horse before feeding him.
2. Feed in small quantities and often.
3. Do not work a horse hard immediately after a full feed.

597. The water which a horse drinks passes almost immediately from his stomach into the small intestines and thence, in the course of a few minutes, to the caecum or blind gut, which is the reservoir from which it is absorbed and used by the horse as needed. To water a thirsty horse immediately after he has eaten causes a considerable portion of the contents of his stomach to be carried with the water into the intestines. As a consequence digestion is incomplete, there is avoidable loss of nourishment, and indigestion or colic may result.

598. The digestive organs of the horse are arranged to admit of leisurely feeding for long periods at a time. Thus a horse will graze 22 out of 24 hours. The fact that the stomach of a horse is small, the capacity of the functional stomach being only about $1\frac{1}{2}$ gallons, points to the necessity for frequent feeding in small quantities. The intestines, on the other hand, are very large and require a considerable bulk of forage to fill them. If bulk is withheld, horses will eat quantities of earth or sand or otherwise become depraved in appetite to fill up the void. A horse will not thrive if bulk of forage in the form of hay or other good roughage is not supplied him, even if highly nutritive food is given in abundant quantities.

A horse requires, roughly, about $2\frac{1}{2}$ pounds of provender daily for each 100 pounds of live weight; that is, about 25 pounds for a 1,000-pound horse. Of this amount the proportion of grain to hay should depend upon the severity of his work. When the work is very light one-third of the allowance should be grain and two-thirds hay; when the work is very heavy two-thirds should be grain and one-third hay. The proportion varies between these limits according to the amount of work the horse is doing.

The daily allowance of oats, barley, or corn is 12 pounds, and of hay 14 pounds for each light artillery horse. It is 14 pounds of grain and 17 pounds of hay for each field artillery horse of

the heavy draft type weighing 1,300 pounds or more. Substitutions of hay for grain or grain for hay are authorized, so that in garrison the horses of an organization may at all times be properly fed in accordance with the severity of their work.

The best substitute for the slow, continuous feeding natural to the horse is regular and frequent feeding. The value of regularity is abundantly proven by experience. The digestive organs become organs of habit, and perform their functions best if called upon to work at fixed and regular times. If not limited by other important considerations, five feeds daily would be better than three, the first one being not later than 6 a. m. and the last at 11 p. m., the other three so that the intervals between feeds are as nearly equal as the work may permit. In the service such frequent feeding is impracticable.

Artillery horses should be fed at least three times a day, at reveille, in the middle of the day, and at night. Ordinarily one-third of the grain ration is fed each time. Hay, if the horses are to work, is not fed in the morning, but about one-third of the ration should be fed at noon and the remainder at night.

599. Immediately after a full feed the stomach and bowels are distended. If hard work is given at once they press against the lungs and impede their power of expansion, thus leading to blowing and distress. Fast work should therefore be avoided after a full feed. Moreover, though such work rarely results in colic, it interferes with digestion to such an extent that looseness of the bowels occurs and the food passes through undigested and is wasted. Food remains in the stomach about 1½ hours. Fast or heavy work should therefore be deferred for from 1½ to 2 hours after a full feed.

600. A bran mash acts as a mild laxative and should be fed once or twice a week to stabled horses. A little dry bran mixed with the oats is of value in compelling more thorough mastication and prevents greedy animals from bolting their grain. In spring or early summer the animals should be grazed daily when practicable. A lump of salt should be kept in each manger.

Before feeding hay it should be thoroughly shaken out with a fork so as to get rid of dust and seed; it is also advisable to

moisten the hay before giving it to the horse. The grain, if possible, should be run over wire screens or allowed to fall through the air to remove dust.

It is advisable to feed at least a portion of the allowance of hay before feeding the grain.

Grain should never be fed or placed in the mangers until it is certain that the horses are thoroughly cool.

In the morning horses are usually fed at or before reveille. The noon feed of hay is usually placed in the mangers while the organization is at drill, but the grain is not fed until the horses are thoroughly cool. The evening feed is placed in the mangers after the stables have been thoroughly policed for the night.

All horses do not require the same amount of forage; the amount given each horse must be based, therefore, upon his individual requirements.

When forage can not be obtained, grazing should be required at every spare moment, especially early in the morning when dew is on the grass, but not if it is covered with frost.

All forage should be inspected by the lieutenant in charge to see that it is up to weight and contract specifications. A forage book, showing daily entries of all forage drawn, fed, and remaining on hand, together with the number of the public and private animals fed, will be kept by the stable sergeant and checked daily by the lieutenant in charge. All officers should be familiar with the characteristics of good forage and the manner in which it is commercially graded for contract specifications. To obtain this knowledge, officers should be encouraged to visit large commercial stables.

Barley possesses a husk so tough and indigestible that it should always be crushed before being fed, else a very great part of its nutrient value is lost.

Sudden changes in food are to be avoided. The digestive organs are frequently unable to accommodate themselves to a sudden change, and scouring, constipation, or colic may result. If sudden changes become necessary, the ration of the new feed should be greatly reduced and then increased gradually to the full requirements.

Good oats weigh about 40 pounds to the bushel; barley about 48 pounds; corn about 56 pounds. Pressed hay weighs about 11 pounds per cubic foot.

The standard bushel in the United States contains 2,150.4 cubic inches. A cubic yard contains 21.69 bushels. A box 16 by 16.8 by 8 inches holds 1 bushel; a box 12 by 11.2 by 8 inches holds half a bushel; a box 8 by 8 by 8.4 inches holds 1 peck; a box 8 by 8 by 4.2 inches holds one-half peck, or 4 quarts.

WATERING.

601. Except when they are heated it is desirable that horses should have free access to water at all times. It is always best to water a horse so frequently that he will never be unduly thirsty. As frequent watering, however, is usually impossible it becomes necessary to water at stated times.

Horses should, if possible, be watered before feeding, or not until two hours after feeding. As horses rarely drink in the early morning, the watering must follow the feeding, but after the proper interval, if practicable.

A horse requires from 5 to 15 gallons of water daily; depending upon the temperature and upon the work he is doing. Except in very cold weather horses should be watered at least three times daily—in the morning, before the noon feeding, and before the evening feeding. In warm weather, water drawn from a cold well or spring should be allowed to stand long enough for the chill to pass off before the horse is allowed to drink.

602. A horse should be allowed ample time to drink his fill and not be led away the first time he raises his head from the water. This must be carefully explained to the untrained man who thinks, because a horse puts up his head to get his wind after his first fill, that he has finished. Horses are always led or ridden to and from water at a walk.

STABLE DUTY.

603. Mounted work, except as noted in paragraph 466, will be followed immediately by stables; the horses are then thoroughly

groomed and the harness and equipment cared for and put away in good order. The lieutenant in charge of Department B is present and in immediate supervision of this work. He is assisted by the first sergeant.

On Sundays or holidays the horses are thoroughly groomed once during the day. This is usually done at morning stables. The lieutenant in charge of Department B or some other officer of the battery is present at this time.

On days that the horses are worked morning stables are held before they go out. At that time each chief of section superintends the removal of manure and foul litter from his stalls or picket line, seeing that it is placed in piles convenient for carting away; he causes the drivers and individually mounted men of his section, after cleaning their stalls, to look over and carefully examine their horses to see that they are fit for work (591), and he causes each horse to be brushed clean of dirt or manure. The lieutenant in charge inspects the general condition of horses and stables at this time.

On returning from a drill or exercise and after a march the horses are unbridled, their collars and traces removed, and the girths loosened. The men then put on stable clothes, relieve themselves, and prepare for the work of caring for the equipment and grooming while the horses' backs are being cooled under the pressure of the saddle. After the bits and collars are cleaned the remainder of the harness is removed from the horses and disposed of deliberately, the necessary cleaning being done at the same time and in the most convenient manner. After the allotted time has been given for the care and disposal of the harness and equipment the horses are groomed and cared for.

The horses are habitually groomed at the picket line.

Under a noncommissioned officer, the horses of the battery commander's detail, the ninth section, and the supply section are groomed by their riders or drivers or detailed privates, two horses to each man.

Under the chief of section the horses of each other section are groomed by their drivers or riders or detailed cannoneers, two horses to each man. An absent chief of section is replaced by a calsson corporal.

The horses of officers are groomed by specially detailed men. The men are marched to the horses, take the position of stant to heel at the direction of the first sergeant, and then begin work as soon as the first sergeant commands: **Commence grooming.**

904. Grooming is essential to the general health and condition of the domesticated horse. Horses improperly groomed with ragged manes, unkempt pasterns, feet improperly looked after, form an indication of an inefficient organization. Clean horses, properly harnessed and smartly turned out, add to the esprit of an organization and give a fair indication of its discipline and efficiency.

The principal use of the currycomb is to clean the brush. For this purpose a piece of hard wood with channels along its surface answers equally well.

The currycomb should never be used on the legs from the knees and hocks downward nor about the head, and when occasionally required to loosen dried mud or matted hair on the fleshy parts of the body it must be applied gently:

To groom the horse proceed as follows:

First clean the front legs, then the hind legs. They will thus have time to dry while the rest of the grooming is being done. Next, on the near side, with the currycomb in the right hand, fingers over back of comb and the brush in the left hand, begin brushing at the upper part of the neck, the mane being thrown to the other side out of the way; thence proceed to the chest, shoulders, back, belly, flanks, loins, and rump. In using the brush the man should stand well away from the horse, keep his arm stiff, and throw the weight of the body against the brush. The principal work of the brush should follow the direction of the hair, but in places difficult to clean it may be necessary to brush against it, finishing by leaving the hair smooth. After every few strokes clean the brush from dust with the currycomb.

Having finished the near side, take the brush in the right hand, the currycomb in the left, and groom the offside in the same order.

Having done with the brush, rub or dust off the horse with the grooming cloth, wipe about the face, eyes, and nostrils, arrange the mane and tail, and clean the dock. Finally go over the legs once more and clean out the hoofs. In cleaning the

mane and the tail begin brushing at the end of the hair and gradually work up to the roots, separating the locks with the fingers so as to get out all scurf and dirt. Tails require frequent washing with warm water and soap. The skin under the flank and between the hind quarters must be soft, clean, and free from dust.

Currycombs, cards, or common combs must never be applied to the mane or tail; the brush, fingers, and cloth are freely used on both.

The wisp is used when the horse comes in wet and also for stimulating the coat. It is made by twisting or plaiting straw into a rope. The ends are then bent together, cut off square, and rubbed on a board until they form a soft, even straw brush. The wisp should be worked forward and backward well into the coat, so that full advantage may be obtained from the friction. After finishing with the wisp the coat should be laid flat.

Hand rubbing is beneficial. When a horse has had very hard, exhausting work his legs should be hand rubbed and afterwards bandaged, taking care that the bandages are not tight. An exhausted horse should also be given stimulants and warm gruel.

The value of grooming is dependent upon the force with which the brush is used and the thoroughness of the other work.

Officers and noncommissioned officers should, by continuous personal supervision, see that the grooming is properly done.

No horse should be considered in order until he is thoroughly clean, his mane and tail brushed out, and laid flat, his eyes and nostrils wiped or washed, and hoofs put in order.

The pasterns and that part of the mane where the crown-piece of the bridle rests should be neatly trimmed and the mane and tail plucked.

At each stable the horses' feet and shoes are carefully examined. Horses requiring shoeing are reported to the chief of section, who notifies the stable sergeant.

The sheath will be kept clean by washing, when necessary, with warm water and castile soap.

A horse should never be teased in grooming. It is bad practice to attempt to make an animal submit to rough or harsh

grooming. To do so means that he will be provoked into kicking, striking, or biting, and perhaps confirmed in these bad habits. If he objects to the use of the brush or currycomb, the hand or cloth should be gently used instead. Careful work will usually win the animal into submitting to the proper use of the grooming tools.

The object of grooming is not merely to clean the coat. The skin must be rubbed and massaged to keep the animal healthy and in condition. An abundance of friction applied to the skin when the horse returns from his work is of special value in keeping him healthy and fit.

Quick grooming is to be encouraged. Under ordinary conditions a horse should be thoroughly groomed in 20 minutes. On the other hand, at least that much time should be devoted to him. Each chief of section, after the necessary time has been devoted to grooming and after he has made a thorough inspection of every animal in his section and finds them all satisfactorily groomed, reports to the first sergeant and to the officer in charge: First (such) section horses in order. The officer, after making a general inspection of the whole section and a critical inspection of three or four of the horses selected at random, may, if the grooming is satisfactory, permit the chief of section to dismiss his men.

605. To confirm recruits in a thorough and systematic method of grooming, and to impress upon them the amount of time to be ordinarily devoted to the different parts of the horse, they are required to groom by detail during their instruction in "The Soldier Mounted."

To groom by detail the instructor causes the men to stand to heel and commands: 1. **By detail**, 2. **COMMENCE GROOMING**. Clean and brush front legs from the knees down, rubbing under the fetlocks and around the coronets with the brush and hand; time, 2 minutes. 3. **CHANGE**. Same as at second command, the hind legs from the hocks down; time, 2 minutes. 4. **CHANGE**. On the near side, with currycomb and brush, groom neck, shoulder, arm, elbow, back, side, flank, loins, croup, and the hind leg to the hock; time, 4 minutes. 5. **CHANGE**. First on the near side, after finishing up on the off side, groom chest between the forelegs, the belly, and between the hind legs; time, 3 minutes.

6. CHANGE. Same as 4, on the off side; time, 4 minutes.
7. CHANGE. Brush head, ears, and throat; with the hand rub the throat and between the forks of the lower jaw; time, 1 minute. **8. CHANGE.** Brush and lay forelock and mane; time, 2 minutes. **9. CHANGE.** Brush out the tail; time, 2 minutes. **10. CHANGE.** With the grooming cloth, or with a damp cloth or sponge if the parts are foul, wipe out the eyes and nostrils; wipe the muzzle, dock, sheath, and up between the hind legs; time, 2 minutes. **11. CHANGE.** Clean out the feet; time, 2 minutes. **12. CHANGE.** Complete any unfinished work. **13. CEASE GROOMING.** **14. STAND TO HEEL.**

Total time required for the horse, at least 24 minutes.

To facilitate supervision, the men must be required to change promptly at the command.

606. To judge the cleanliness of a horse, the hand may be passed the reverse way of the hair to get a view of the skin. When the points of the fingers are run firmly against the set of the coat, lines of gray are left on the coat of a dirty skin and the points of the skin are covered with scurf. Between the branches of the under jaw, under the crownpiece of the halter, at the bends of the knees and hocks, under the belly and between the forelegs and thighs are the places usually neglected when the work is not thorough and which should be looked at when the horse is being inspected.

607. Horses should never be hurried in turning around in their stalls. Should the stalls or driveway be covered with ice or be otherwise slippery, sand or litter should be sprinkled on them.

608. Horses are particularly terrified by fire. Should a fire occur in the stables they must be led, backed, or ridden out of the stable. If they are unwilling a coat or gunny sack should be thrown over their eyes. Care should be taken that they do not break back into the stables.

Section 15. The Battery Mounted.

GENERAL PROVISIONS.

467. Recruits after their first three months' instruction, and older men during any instruction year, are specialized for

their particular places in the battery, such as cannoneer, driver, telephone operator, etc.

466. The saber is carried at ceremonies. When the captain draws saber the lieutenants will also draw saber.

469. Unless otherwise stated, the text refers to light batteries. With necessary modifications in distances and in the duties of cannoneers, it becomes equally applicable to horse batteries.

Special directions are given herein when the gun squads of horse batteries have to make any particular movement. When the gun squads are not mentioned, they have only to maintain their posts in rear of their caissons, dressing toward the side of the guide. In section column the guide of each gun squad is without indication to the right. When flank column or double section column is formed, the gunners form their squads on the outer flank of the caisson, the cannoneers of the front rank aligned on the axle of the limber.

470. A gun section consists of a gun and its caisson, manned, horsed, and equipped.

A caisson section consists of two caissons, manned, horsed, and equipped.

The leading caisson of each caisson section in the normal order in park is called the first caisson; the other is called the second caisson. What is prescribed in the text for pieces and caissons of gun sections applies, with obvious modifications, to first and second caissons of caisson sections, respectively.

471. The rests are executed and the attention is resumed according to the principles already explained for "The Soldier Mounted" and "The Driver" (459).

ORGANIZATION OF THE BATTERY.

472. The battery as organized on a war footing is shown in the Tables of Organization. It is commanded by the captain. The first platoon is commanded by the executive; the second platoon by the assistant to the executive; the third platoon by the reconnaissance officer, when that officer is not otherwise employed; and the fourth platoon by the lieutenant in charge of Department B (32).

The **first sergeant** is assistant to the captain, and is responsible to him for the general good order, police, and discipline of the battery.

The **stable sergeant** is responsible for the general care of the public animals assigned to the battery and the good order and police of the stables, picket lines, etc.

The **supply sergeant** is responsible for the care of all Government property issued to the battery.

The **mess sergeant** is responsible for the proper messing of the battery.

The **chief mechanic** is responsible for the good order and repair of the matériel in actual use by the battery. In action he assists the executive.

The **sergeants** command sections.

The **gunners** are responsible for the good order of their guns, carriages, limbers, and equipment.

Each **caisson corporal** is placed in charge of a caisson, and acts as assistant to his chief of section.

473. On subdivision for action the battery is divided into the **firing battery** and the **combat train**. The firing battery comprises the first five sections. It is under the immediate command of the captain. The combat train comprises the sixth, seventh, eighth, and ninth sections. It is commanded by the lieutenant in charge of Department B. He is assisted by the stable sergeant.

474. On a peace footing the sixth, seventh, and eighth sections are not manned or horsed. Otherwise the organization is similar to that on a war footing and is separately shown in the Tables of Organization.

475. In light batteries the cannoneers are on foot or mounted on the carriages at the discretion of the captain; they are not ordered to mount or dismount when the battery is marching at trot or gallop.

In horse batteries every one is mounted; the cannoneers, except the horse holders, dismount to serve the guns.

FORMATIONS OF THE BATTERY AND POSTS OF INDIVIDUAL FORMATIONS.

476. The habitual formations are the order in line, the order in section column, the order in flank column, and the order in battery.

477. The order in line is that in which the sections of the battery are formed abreast of each other in the order, or the reverse order, of their numbers from right to left. The carriages are limbered, and in each section are in section column the pieces being either in front or in rear of their caissons. In the normal order in park the pieces are usually in front.

If the carriages of each section are in double section, the formation is called a double section line.

478. The order in section column is that in which the sections of the battery follow each other in the order, or the reverse order, of their numbers, from front to rear. The carriages are limbered, and in each section are in section column (424), the pieces being either in front or in rear of their caissons.

If the carriages of each section are in double section, the formation is called a double section column.

479. The order in flank column is that in which the sections of the battery follow each other in the order, or the reverse order, of their numbers, from front to rear. The carriages are limbered, and in each section are in flank column, the caissons being all either on the right or left of their pieces (404).

480. The order in battery is that in which the pieces and caissons of the gun sections, placed for action, are in line in the order, or the reverse order, of their permanent numbers, from right to left; the caissons of the fifth section, unlimbered, one on each flank of this line, or otherwise disposed by direction of the captain or the executive; the limbers either in rear of their carriages or formed at such other place as the captain may order.

The sections comprising the combat train, when present, are posted at the discretion of the captain.

481. The intervals and distances for hitched carriages (423) apply to the formations of the battery. In the order in battery

the intervals between adjacent wheels of gun carriages is that prescribed for hitched carriages in line.

In column or in line, the distance between a carriage and a mounted gun squad is 2 yards; in flank column the distance between caissons is such as to permit each caisson to march abreast of its piece; in line, when the pieces lead, the distance between caissons of the caisson sections is such that they march in line with the caissons of the gun sections. In battery, when the limbers take post in rear of their carriages, the distance between the line of pieces and that of the teams is 25 yards, measured from the rear of the caissons to the heads of the lead horses.

482. When the teams are short one or more pairs, the intervals are diminished 3 yards for each pair that is missing; should the teams have more than three pairs the intervals are increased 3 yards for each additional pair.

If any carriage has lost one pair of horses or more, it has the same position as if the team were complete.

483. Ports of Individuals.

Individuals.	Order in line.	Order in section column.	Order in flank column.	Order in battery.
Captain.....	8 yards in front of the battery opposite the center.	Opposite the center of the column and 15 yards from the left flank.	Opposite the center of the column and 15 yards from its flank; on the left when the right section leads, and on the right in the reverse order.	Halfway between the two center sections, 10 yards in rear of the line of the trail spades.
Platoon commander.	Halfway between his sections and in line with the lead drivers of his leading carriages.	Opposite the center of his platoon, 4 yards from the left flank.	Halfway between the pieces and caissons, and in line with the lead drivers of his leading carriages.	Halfway between the guns of his platoon, and 5 yards in rear of the line of the trail spades.
First sergeant	Halfway between the center sections, opposite the rear of the rear carriages.	Opposite the center of the battery, 4 yards from the right flank.	Opposite the center of the column and 4 yards from its flank; on the right when the right section leads, and on the left in the reverse order.	Halfway between the two center sections, 20 yards in rear of the line of the trail spades.
Chief of section.	Boot to boot with the lead driver of his leading carriage.	Same as in line....	Boot to boot with the lead driver of his piece. In double section he has the same post.	2 yards in rear of his caisson and opposite its center.
Caisson corporal.	Boot to boot with the lead driver of his caisson; but if the chief of section is posted with the caisson, then boot to boot with the swing driver.	do.....	Boot to boot with the lead driver of his caisson.	Same as in line.

Individuals.	Order in line.	Order in section column.	Order in flank column.	Order in battery.
Guidon.....	Abreast of the guide of the battery and 2 yards to his left. Before leaving park, 4 yards from the right flank of the battery aligned on the lead drivers.	Abreast of the leading guide of the battery, and 2 yards to his left.	Abreast of the guide of the battery and 2 yards to his left.	With the combat train.
Bugler.....	Boat to boat with each other, 2 yards in rear of the captain.	Same as in line.....	Same as in line.....	Same as in line.

484. The cannoneers take the posts prescribed for them as members of gun or caisson squads.

In horse batteries, the post of the gun squad with the carriages limbered is 2 yards in rear of the caisson except in flank column or double section column (469). When the carriages are unlimbered, the horse holders, with the horses of the squad, take post 2 yards in rear of the caisson limber.

485. The special details are posted and maneuvered with the first caisson of the fifth section in a manner similar to that of a mounted gun squad.

486. When the battery is accompanied by such personnel as the supply sergeant, the stable sergeant, mess sergeant, mechanics, cooks, etc., when the ninth section is not present, such men are assigned to posts at the discretion of the captain. It will usually be found desirable to post them as members of gun or caisson squads, if they are dismounted; or, if they are mounted, to post them in line boot to boot in the order of rank from right to left as follows: In the order in line, 4 yards from the left flank of the battery, abreast of the lead drivers; in the order in battery, 4 yards from the left flank of the line of limbers or teams, abreast of the lead drivers; in column, either 4 yards in front of the leading section, or 4 yards in rear of the last section, according as the column has been formed toward their flank of the battery or the flank opposite. During the maneuvers of the battery they retain their relative positions and do not change to the opposite flank on account of the battery being faced to the rear.

487. The posts designated in the foregoing table are the typical ones. The captain, however, goes wherever his presence is required, where he may best observe, and where his commands may best be heard. The lieutenants leave their posts if it is necessary for the purpose of supervising the work of their platoons. The chiefs of section habitually maintain their posts during the maneuvers of the battery; but during the practice of fire discipline, during marches, and at other times when necessary, they leave their posts in order to supervise the work of their sections.

THE PARK.

DISPOSITION OF THE CARRIAGES.

488. The carriages are ordinarily arranged in park in the order in line, the sections arranged from right to left in the order of their numbers, the pieces in the front rank. The interval between adjacent carriages may be either the normal interval or such as the captain may direct; the distance between the ranks of carriages is such that, when hitched, the distance is that prescribed in paragraph (423).

TO FORM THE BATTERY IN THE PARK.

489. The battery, dismounted, being formed on the battery parade (151), the first sergeant commands: **Drivers to the front.**

The chiefs of section and driver squads step 6 yards to the front; the chiefs of section place themselves in front, and the individually mounted men in the line of file closers of the squads thus formed. The first sergeant sees that suitable ammoneers are detailed to replace absent drivers, closes the driver squads toward either flank, and directs the senior chief of section to march them to the horses.

On arrival at the stable or picket line, the chief of section in charge halts the drivers and commands: **Harness.** The drivers all out and harness under the supervision of their respective chiefs. Chiefs of section and other individually mounted men saddle their horses while the drivers harness.

The drivers having been marched off, the first sergeant closes the gun squads to either flank and directs the senior gunner to march them to the park. The senior gunner, on arrival at the park, posts the gun squads with their carriages.

If the carriages are in a gun shed, the senior gunner halts the column in front of the building, gives the necessary directions for the formation of the park, and commands: **Form park.**

The cannoneers fall out, the carriages are run out by hand and formed in park.

The park being in order, the senior gunner posts the cannoneers at the carriages limbered (181). He then commands:

Put your carriages in order. At that command each gunner and No. 4, under the supervision of the chief mechanic, prepare the carriages for hitching in. The remaining cannoneers either assist in this work or are sent to assist in policing the picket line or stables, as may be directed. They are returned to their posts by the time the teams are hitched.

When the horses are harnessed, the first sergeant designates the place of formation and commands: **LEAD OUT**; or, 1. **First (such) sections, 2. LEAD OUT.**

The sections lead out and form in column. The first sergeant mounts the drivers, conducts the column to the park, posts the teams with their carriages, and causes them to be hitched.

If the park is near by, the first sergeant, as soon as the horses are harnessed, commands: 1. **To your carriages**; 2. **LEAD OUT**; or, 2. **First (such) section, 3. LEAD OUT.** He then gives the commands for hitching as before.

In all cases the first sergeant sees that the cannoneers perform their duties in the park and that the drivers harness, lead out, and hitch with the least practicable delay and without noise or confusion.

490. In the field when the horses are harnessed at the carriages the duties are performed in a similar manner. The senior chief of section, on the arrival of the drivers at the picket line, commands: **Harness and hitch.** The teams are hitched by the drivers, under the direction of their chiefs of section, according to the methods heretofore prescribed.

491. In horse batteries, as soon as the park is formed and the carriages made ready for use, the senior gunner directs the gunners to march their squads to the horses and have the horses saddled.

The squads may be required to lead out with the teams of their sections. In this case they form in rear of the teams and are marched to the park with them, each gunner posting his squad in rear of its caisson as the teams of the section are being posted with their carriages.

If the squads are not ready when the teams are harnessed the first sergeant may direct that the teams be led out and posted as above prescribed; when ready each squad is then led out and formed by its gunner, marched to the park, and posted.

492. The lieutenants reach the park or the stables at such time as is necessary for them to superintend the proper details of their departments (32). They take their posts as chiefs of platoon, as soon as the teams are posted with the carriages, and in time to superintend the hitching.

493. Each chief of section, as soon as his teams are hitched, makes a minute inspection of his section and reports the result to his chief of platoon.

494. Each chief of platoon, having received the reports of his chiefs of section and made a general inspection of the platoon, commands: **REST.**

495. The special details and the other individually mounted men take their posts during the hitching.

The buglers report to the captain at such time and place as he may direct.

496. Upon the approach of the captain the chiefs of platoon call their platoons to attention, and as soon as the captain takes his place in front, report in succession from right to left: (Such) platoon in order, sir; or if anything be missing or out of order they so report.

As soon as the chiefs of platoon have reported, the first sergeant reports to the captain (151).

TO DISMISS THE BATTERY.

497. As soon as the battery is parked each chief of section makes a minute inspection of his section and reports all losses or injuries to the chief of platoon; the chiefs of platoon then report in succession from right to left: (Such) platoon in order, sir; or if anything be missing or out of order they so report.

The reports having been made, the captain gives such instructions as may be necessary, and directs the first sergeant: **Dismiss the battery.** The officers return saber, if drawn, and fall out.

The first sergeant commands: 1. Cannoneers; 2. **UNHITCH**; or, 1. Drivers, 2. **UNHITCH**, 3. **UNHOOK TRACES.**

The special details and other individually mounted men leave the park and return their horses to the stable or picket line.

The teams being unhitched, the first sergeant marches them to the stable or picket line and commands: **FALL OUT.** Each

chief of section thereupon takes charge of his section, dismounts the drivers, causes them to unhook traces, if necessary, and lead to their places for unharnessing.

If the stables or picket lines are close by, the first sergeant commands: 1. **By the right** (left, or right and left), 2. **FALL OUT**, and the drivers lead at once to their stalls or to their places on the picket line.

The lieutenant in charge of Department A, assisted by the chief mechanic, superintends the work of the cannoneers in caring for the wheeled matériel.

The lieutenant in charge of Department B, assisted by the first sergeant and stable sergeant, superintends the work of the drivers in caring for their harness and horses.

498. In the field, when the horses are unharnessed at the carriages, the duties are performed as above described, except that the first sergeant, when directed to dismiss the battery, commands: 1. **Drivers**, 2. **UNHITCH AND UNHARNESS**.

The teams are unhitched and unharnessed by the drivers under the direction of their chiefs of section, according to the methods heretofore prescribed, the horses being tied to the picket line as soon as unharnessed.

499. In horse batteries, while the drivers are unhitching, the senior gunner forms the gun squads, marches them to the stable and commands: **FALL OUT**. Each gunner conducts his squad to its place in the stable and causes the cannoneers to unsaddle and care for their equipments; he assigns suitable cannoneers to the care of the horses, so that there is one man for each two animals; he then marches the remaining cannoneers back to the park to care for the matériel.

ROUTE MARCHES.

500. The section column is the habitual column of route; the distance between carriages is that prescribed in paragraph 423, but may be increased when the ground is difficult. When the length of the column is not a matter of importance, distance may also be increased to avoid thick dust.

Being in march: **ROUTE ORDER**, or **AT EASE**.

Executed according to the principles already prescribed.

To resume the attention, the captain commands: 1. **Battery**, 2. **ATTENTION**.

The leading carriage is responsible for, and sets the pace of, the march.

The post of the captain on a route march is 15 yards in front of the lead horses of the leading carriage. The captain, however, must frequently let the column pass him in order to observe the condition of men and horses.

One bugler accompanies the captain; the other, the executive. If a third bugler is present, he accompanies the commander of the combat train.

The chiefs of platoon habitually march opposite the rear carriages of their platoons and superintend the march, going wherever their presence may be required.

The chiefs of section leave their posts whenever necessary to superintend the march of their sections.

At each halt, chiefs of platoon and chiefs of section carefully inspect to see that their drivers faithfully perform their duties.

To avoid dust, the officers and noncommissioned officers may march on the windward side of the column. For similar reasons the cannoneers are permitted to march on the right or left, to take advantage of a footpath, etc.

When the road is suitable, the drivers and horses should be rested frequently by dismounting the drivers. Before going down hill or over rough parts of the road, the wheel drivers should mount without command, dismounting again when on the level or when the rough place is passed.

MANEUVERS OF THE BATTERY.

GUIDES.

508. The guide of a carriage is its lead driver; of a section in section column, the lead driver of its leading carriage; of a section in double section, the lead driver of its left carriage.

Chiefs of section supervise the gait and direction of march of their sections.

In section column, the guide of the leading section is the guide of the battery.

509. The guide of the battery in line is the guide of the right, left, or center section.

510. The guide of the battery in flank column is the guide of the leading carriage on one flank or the other.

511. During an oblique march the guide of the battery is, without indication, the guide of the leading carriage on the side toward which the oblique is made.

512. On leaving park the guidon at once posts himself with the guide of the battery. If a subsequent maneuver places the guidon at the rear of a section column, he hastens to post himself with the guide of the leading section; if with a rear carriage in line or in flank column, he hastens to post himself with the guide of the leading carriage nearest his former position, or takes post with the indicated guide in case a guide is announced. On the formation of double section the guidon posts himself with the left carriage of the guiding section. During an oblique march the guidon does not change position.

513. With the exception just noted, the guide is habitually toward the guidon; while he is changing position, it is toward the guide with whom he is to take post.

514. The captain may announce or change the guide thus: Guide (right, left, or center).

515. If the captain desires, he may place himself in front of any carriage of the battery, and command: Guide on me. The carriage in rear of the captain then follows his movements and the others guide on this as the directing carriage, regulating their march and gait so as to maintain their proper relative positions. The guidon posts himself with the directing carriage.

GAITS.

516. Unless otherwise specified, horse artillery executes the movements herein described at the walk, trot, or gallop; light artillery, at the walk and trot only. For light artillery the gallop should usually not be used, except for short distances when all carriages are in line or column and when a change of direction for any carriage is not involved (36-38).

517. In changes of formation the carriages which establish the direction and rate of march of the new formation are termed directing carriages.

518. Reducing the gait **one degree** is to be understood as passing from the gallop to the trot, from the trot to the walk, or from the walk to the halt.

Increasing the gait **one degree** is to be understood as passing from the halt to the walk, from the walk to the trot, or from the trot to the gallop.

519. The following rules govern the gaits during changes of formation:

MOVEMENTS FROM COLUMN INTO LINE, AND ANALOGOUS MOVEMENTS.

Rule I. When a change of formation requires certain carriages to gain ground so as to reach specified positions abreast of the directing carriages, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing carriages maintain their gait; the other carriages move at the gait announced until they have reached their new position, when they take the gait of the directing carriages.

If the captain does not announce an increased gait, the directing carriages reduce their gait one degree; the others maintain their gait until they reach their new position, when they take the gait of the directing carriages. If the movement is executed from a halt or while marching at a walk, and an increase of gait is not ordered, the directing carriages advance three carriage lengths toward the front of the new formation and halt.

This rule applies to forming line from column, double section line from line, flank column from section column or double section column, double section column from section column or flank column, closing or extending intervals, and wheeling by battery.

MOVEMENTS FROM LINE INTO COLUMN, AND ANALOGOUS MOVEMENTS.

Rule II. When a change of formation requires the directing carriages to gain ground in order to precede the other carriages, the captain may or may not announce an increased gait

for the movement. If he announces an increased gait, the directing carriages take the increased gait at once, the other carriages take it up so as to follow the movement in their proper order.

If the captain does not announce an increased gait, the directing carriages maintain their gait, the others reduce the gait one degree, and take the gait of the directing carriages in time to follow the movement in their proper order. If the movement is executed from a halt, or while marching at a walk, and an increase of gait is not ordered, the directing carriages move at a walk; the others remain halted, or halt and take up the gait of the directing carriages as before.

This rule applies to forming column from line, line from double section line, section column from flank column or from double section column, and passage of carriages.

TO ALIGN THE BATTERY.

520. The battery being in line at a halt:

If the section on the side toward which the alignment is to be made is not in proper position, the captain establishes it in the position desired, and commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT**. At the command dress the other carriages move forward or backward, preserving their intervals; the drivers cast their eyes to the right and dress on the drivers of the carriages established as a basis of alignment. The captain places himself on the right flank in line with the wheel driver of the base carriage, facing to the left; he quickly establishes the wheel driver of the leading carriage of the second section on the desired line, and then superintends the alignment of the other wheel drivers of the front-rank carriages. The first sergeant similarly superintends the alignment of the wheel drivers of the rear-rank carriages. The captain commands front when the alignment is complete, at which command the captain and first sergeant resume their posts and the drivers turn their eyes to the front.

521. In horse batteries, at the command dress each gun squad aligns itself toward the side ordered, under the supervision of its gunner.

TO MARCH TO THE FRONT.**522. 1. Forward, 2. MARCH.**

Executed simultaneously by all the carriages (452).

THE HALT.**523. 1. Battery, 2. HALT.**

Executed simultaneously by all the carriages (453).

TO MARCH BY THE FLANK.**524. 1. By the right (left) flank, 2. MARCH.**

All the carriages simultaneously turn to the right (455), the rear carriages taking the track and distance from the carriages which precede them in the new formation.

525. If the battery is in line, with closed intervals, the following modifications apply: The movement is successive; the section on the indicated flank begins the movement; the others take it up in turn so as to follow, at the proper distance, in the track of the carriages which precede them. If executed while marching, all the sections except the one on the indicated flank halt, and then resume the march so as to follow in their proper places in the column.

TO MARCH TO THE REAR.**526. By an about: 1. Right (left) about, 2. MARCH.**

All the carriages simultaneously turn to the right about (455), the rear carriages taking the track and distance from the carriages which precede them in the new formation.

By a countermarch: 1. Countermarch, 2. MARCH.

The leading carriage of each section executes left about as just described; the rear carriages follow in the track of the leading carriage, and execute a left about on the same ground.

527. If the battery is in line, with closed intervals, the following modifications apply: The captain first commands: **1. Right sections forward, 2. MARCH.** The right section of each platoon moves forward so as to clear the left section. If the

captain orders an increased gait for the maneuver, the right sections take the gait indicated; if an increased gait is not ordered, the left sections reduce the gait 1° , or, if halted, they remain halted. As soon as the right sections are clear of the left sections, the captain gives the command for the about or the countermarch, which is executed by all the sections at the gait of the right sections. On the completion of the about or countermarch, the sections in rear increase the gait so as to reach their positions in line.

528. In horse batteries, in executing an about, if the pieces are in front, they reduce the gait slightly so as to follow the gun squads at 2 yards' distance; if the caissons are in front, they increase the gait slightly on completing the about, so as to follow the pieces at 2 yards' distance.

TO MARCH OBLIQUELY.

529. 1. Right (left) oblique, 2. MARCH.

All the carriages simultaneously turn to the oblique (455). The carriages move in parallel lines. The lead drivers align themselves in each rank of carriages; the lead driver of each rear-rank carriage also aligns himself upon the lead driver of the carriage corresponding to his own in the front rank. If these positions are properly maintained, the carriages should, on executing a second oblique in either direction, have the proper distances, intervals, and alignment.

TO CHANGE DIRECTION.

530. 1. Column right (left), 2. MARCH.

If in section column the leading carriage turns to the right through an angle of 90° . The carriages in rear follow and turn on the same ground.

If in double section or flank column the carriages on the side toward which the turn is made, execute the movement as before. In each section, as the inside carriage begins the turn, the outside carriage increases the gait 1° , preserves its interval from the inside carriage and takes the gait of the latter on arriving abreast of it.

Column half right (left) is similarly executed.

531. Being in line: 1. Battery right (left) wheel, 2. MARCH.

The pivot section executes column right. The other sections by twice executing column half right place themselves on the line established by the pivot section.

Rule I governs the gait (519).

Battery right (left) half wheel is similarly executed.

TO EXECUTE A PASSAGE OF CARRIAGES.

532. Being in line or in section column, to place the rear carriages in front: 1. Pieces (Caissons) front, 2. MARCH.

The carriages designated in the command are the rear carriages in the existing formation.

In each section the designated carriage inclines to the right, passes the other carriage, takes position in front of it, and continues the march; the carriage thus placed in rear then follows at the prescribed distance.

Rule II governs the gaits (519).

TO CLOSE OR EXTEND INTERVALS IN LINE.

533. 1. On (such) section, 2. To (so many) yards, 3. Close (Extend) intervals, 4. MARCH.

The indicated section moves straight to the front; the other sections incline toward or away from the indicated section and move to the front when at the proper interval.

Rule I governs the gaits.

TO FORM SECTION COLUMN TO THE FRONT FROM LINE.

534. 1. Right (Left) by section, 2. MARCH.

The right section moves straight to the front. The other sections in turn change direction to the right and follow in the column at the proper distance.

Rule II governs the gaits.

TO FORM LINE FROM SECTION COLUMN.

535. To the front: 1. Right (Left) front into line, 2. MARCH.

The leading section moves straight to the front. Each section in rear obliques to the right until opposite its place in

line, when it obliques to the left, moves to the front, and takes its place on the line.

Rule 1 governs the gaits.

536. To the right (left): 1. Right (Left) into line, 2. MARCH.

The leading section executes column right and then moves straight to the front. The other sections move forward and successively execute column right, when, by so doing, they will be opposite their positions in line; they then move to the front and take their places on the line, to the right of the carriages which preceded them.

If, in the execution of the movement, the sections in rear move at a faster gait than the leading section, the second section in the column inclines to the right sufficiently to clear the leading section.

Rule 1 governs the gaits.

537. On the right (left): 1. On right (left) into line, 2. MARCH.

Executed as prescribed for right into line, except that the second section in the column inclines to the left in order to clear the leading section, and that each section passes beyond the preceding one before turning to the right; also that the leading section is habitually halted on advancing three carriage lengths after the completion of its change of direction.

538. To form line at closed intervals, the captain commands: At (so many) yards, before giving the prescribed commands for forming line; the battery is then formed with the intervals prescribed.

TO FORM FLANK COLUMN FROM SECTION COLUMN.

539. 1. Flank column, 2. Right (left) oblique, 3. MARCH.

The rear carriages of all the sections oblique to the right simultaneously, and then oblique to the left, when by so doing they will have their proper intervals from the leading carriages. All carriages in rear of the leading one close upon the carriages which precede them in the column at the gait of the carriages which oblique.

Rule 1 governs the gaits.

TO FORM LINE TO THE FRONT FROM FLANK COLUMN.

540. 1. Right (left) front into line, 2. MARCH.

The carriages on the right of the column execute right front into line, as prescribed for a section column. The carriages on the left move by the right flank, and each forms in section column behind the right carriage of its own section.

Rule I governs the gaits.

TO FORM LINE TO THE FLANK AT CLOSED INTERVALS FROM FLANK COLUMN.

541. 1. At (so many) yards, 2. Right (left) into line, 3. MARCH.

In each column the carriages execute right into line as prescribed for the sections in paragraph 536, each section marching by the right flank in time to be opposite its place in line.

TO FORM SECTION COLUMN FROM FLANK COLUMN.

542. 1. Pieces (caissons) front, 2. MARCH.

The designated carriage of the leading section moves straight to the front; the other carriage of this section obliques toward the designated carriage in time to follow in its track at the prescribed distance. The remaining sections in the column execute the movement similarly, each carriage moving out in time to follow the preceding one at the proper distance.

Rule II governs the gaits.

TO FORM DOUBLE SECTION AND TO RESUME THE PREVIOUS ORDER.

543. Being in line or in section column: 1. Double section, 2. Right (left) oblique, 3. MARCH.

In each section the rear carriage inclines to the right and places itself abreast of the leading carriage at an interval of 2 yards.

If in section column, all carriages in rear of the leading one close upon the carriages which precede them in the column at the gait of the carriages which incline.

Rule I governs the gaits.

544. To resume the previous order: 1. Pieces (caissons) front, 2. MARCH.

If in column, the designated carriage of the leading section moves straight to the front; the other carriage inclines toward the designated carriage in time to follow in its track at the prescribed distance. The remaining sections in the column execute the movement similarly, each carriage moving out in time to follow the preceding one at the proper distance.

If in line, the movement is executed simultaneously by all the sections.

Rule II governs the gaits.

545. Being in flank column: 1. Double section, 2. Right (left) oblique, 3. MARCH.

In each section the right carriage moves or continues straight to the front, the left one inclines sharply to the right, and moves up abreast of the right carriage at 2 yards interval.

Rule I governs the gaits.

546. To resume the previous order: 1. Flank column, 2. Right (left) oblique, 3. MARCH.

In each section the left carriage moves or continues straight to the front, the left one inclines sharply to the right and then moves up abreast of the left carriage at the prescribed interval.

Rule I governs the gaits.

547. The section being formed in double section retains that formation until again formed in section or flank column, and is maneuvered as if it were a single carriage. In executing the turns the pivot carriage executes the movement as heretofore prescribed; the other carriage conforms to the movement of the pivot carriage, increasing the gait so as to arrive abreast of the latter without delay.

The double section line or column is maneuvered as explained for the normal order in line or in section column, with the exceptions made necessary by the difference of formation. The carriages retain their relative order until they are again formed in the normal order in line, in section column, or in flank column. The posts of individuals are analogous to those prescribed for the order in line or column.

PASSAGE OF OBSTACLES.

548. If, while maneuvering or marching, an obstacle is encountered by any subdivision, its chief, without waiting for orders, gives appropriate commands for avoiding the obstacle and for resuming the original formation as soon as the obstacle is passed.

TO SUBDIVIDE THE BATTERY FOR ACTION.

549. Before unlimbering the guns for action, the battery is subdivided into firing battery and combat train (473).

550. To subdivide the battery and prepare it for action, the captain commands: **PREPARE FOR ACTION.**

The carriages of the firing battery are at once prepared for action, as explained in Firing Instruction. Each chief of platoon inspects his unit and reports to the captain whether or not all parts of the material are in working order. The reconnaissance officer and the combat-train commander report to the captain for instructions.

The subdivision is ordinarily effected in rear of the position to be occupied. If the guns have to be moved a considerable distance or over rough ground to reach the position, the panoramic sights and range quadrants are replaced in their cases, and are again placed in their seats when the position is reached. As the guns are moved forward to their position, the combat-train commander posts the combat train under cover in the general locality indicated by the captain.

The first caisson of the fifth section is habitually unlimbered on the right of the line of guns, the second caisson on the left. Depending upon the nature of the ground and the circumstances of the case, the fifth section may either follow the remainder of the battery toward the position for action and take post under the direction of its chief in the most convenient manner, or, at the subdivision for action, the caissons may take post on the proper flanks of the battery, accompany it to the position, and unlimber simultaneously with the guns. In the absence of special instructions from the captain the chief of the fifth section adopts the measures best suited to the immediate case. One or

both caissons may be unlimbered in rear of the line under cover, depending upon the nature of the ground and the character of the action. If practicable, the captain uses the caisson on the windward flank as his observing station.

If it is desired to subdivide the battery without preparing for action the captain gives the necessary instructions.

TO FORM IN BATTERY AND TO RESUME A MARCHING FORMATION.

GENERAL PROVISIONS.

551. The double section line and the double section column are the habitual formations preliminary to taking the order in battery. The double section line is adapted to unlimbering for action either to the front or the rear; the double section column, to unlimbering for action to the flank. By suitable maneuvers the battery is placed on the desired ground in the appropriate formation before the commands for unlimbering are given.

552. When unlimbering to fire projectiles, or for the practice of fire discipline, the captain and the chiefs of platoon and section dismount. The captain's horse is held by one of the musicians, the horses of the executive and his assistant by another. Each chief of section passes his reins to the swing driver of his piece; these horses are led off with the limbers, and are returned in like manner on limbering after action.

Other individually mounted men habitually dismount when their duties require them to remain with the firing battery. The horses are held under cover.

553. In horse batteries, the cannoneers, except horse holders, dismount at the command **Action front** (rear, etc.), link their horses and run to the carriages. The horse holders follow the limbers and post the led horses in rear of the caisson limbers.

554. In active service and in instruction simulating it, the limbers are habitually placed under cover in the vicinity of the guns, and generally on the flank. At ceremonies limbers are placed in rear of their carriages. If the captain desires the limbers to be posted under cover, he indicates, before giving the commands for unlimbering, the position they are to take.

555. When posted elsewhere than in rear of the guns, the limbers are formed so as to take the best advantage of cover, generally in double section line faced toward the enemy, and with intervals of about 20 yards between limbers of adjacent sections. If unlimbered from line, the limbers of each section execute a left about and move straight to the rear; if from column, they turn toward the rear of the position. After thus clearing the front of the position, they form in double section column at the command or signal of the first sergeant and are conducted by him to the place designated by the captain, where they are formed right or left into line, as the case may be. If the position is to be occupied for a considerable time, the first sergeant may dismount the drivers and allow them to stand at rest.

If the horses are heated and the air is chilly, the teams should be put on a circle and walked to cool them out whenever practicable.

556. If the limbers are posted on the flank of the battery, at the command or signal for limbering, they file off from the flank nearest the battery and move in section column toward it; on approaching the position, the piece and caisson limbers separate and form in two columns, each column being directed toward the trails of the corresponding carriages.

As soon as the fifth section caissons are limbered, the chief of this section assembles his section on the proper flank of the battery and in a formation similar to that of the remaining sections of the battery.

557. In unlimbering, the limbers habitually move to their posts at a trot. In limbering, they move at a walk, unless an increased gait is ordered.

558. Before unlimbering effort should be made to place the battery in position so that the guns, when unlimbered, will be approximately aligned with uniform intervals.

TO FIRE TO THE FRONT.

559. Being in double section line, the caissons on the left of their pieces: **ACTION FRONT.**

Executed as prescribed in paragraph 199.

TO FIRE TO THE REAR.

560. Being in double section line, the caissons on the right of their pieces: **ACTION REAR.**

Executed as prescribed in paragraph 200.

TO FIRE TO THE FLANK.

561. Being in double section column, the caissons on either flank of their pieces: **ACTION RIGHT (LEFT).**

Executed as prescribed in paragraph 201.

TO LIMBER TO THE FRONT AND REAR, AND TO MARCH.

562. 1. Limber, 2. **FRONT AND REAR.**

Executed as prescribed in paragraph 202.

After limbering to the front and rear, the teams of each section face in opposite directions.

563. To march in line: 1. Pieces (Caissons) front, 2. **MARCH.**

The carriages designated move straight to their front; the others execute a right about and quicken the gait so as to follow in section column the carriages of their own sections which precede in the movement.

564. To march in column to the flank: 1. **Flank column,** 2. Pieces by the right (left) flank, 3. **MARCH;** or, 1. **Double section,** 2. Pieces by the right (left) flank, 3. **MARCH.**

All the carriages move by the flank in the indicated direction, the caissons so regulating the gait as to place themselves abreast of their pieces in flank column or double section, as the case may be.

TO LIMBER TO THE REAR, AND TO MARCH.

565. 1. Limber, 2. **REAR.**

Executed as prescribed in paragraph 203.

After limbering to the rear, the teams all face in the same direction.

566. To march in line: 1. Pieces (Caissons) front, 2. **MARCH.**

The carriages designated move straight to the front; the others follow their proper carriages in section column.

567. To march in column to the flank.

Executed as prescribed in paragraph 564.

TO FORM DOUBLE SECTION LINE AFTER LIMBERING.**568. 1. Form double section line, 2. MARCH.**

If the battery has been limbered front and rear, the caissons stand fast; each piece inclines to the right, executes a left about, and places itself in double section on the right of its caisson.

If the battery has been limbered rear, the caissons stand fast and each piece moves up and places itself in double section on the left of its caisson.

Section 16. Battery Inspection, Mounted.

730. The battery being in double section line, the captain commands: 1. Prepare for inspection, 2. **ACTION FRONT.**

At this command the gun platoons are unlimbered and prepared for firing. The chiefs of the other platoons move their platoons to the rear by a left about, and, after gaining sufficient distance, execute a second left about and form their platoons in double section line abreast of the limbers of the gun sections.

The chief of the first and second platoons take post opposite the center and 4 yards in front of the line of muzzles of their platoons. The chiefs of the other platoons take post opposite the center and 4 yards in front of the lead drivers of their platoons.

All the carriages being in position, the captain commands: 1. **Right**, 2. **DRESS**, verifies the alignment of the officers and the two ranks of carriages, commands: **FRONT**, and posts himself, when not acting as inspector, opposite the center of the battery and 8 yards in front of the line of muzzles.

The ninth section constitutes an additional platoon, which is commanded by the senior sergeant with it (**488**). When the ninth section is not present its personnel is assigned as prescribed in paragraph **486**.

The guidon is 4 yards from the right flank of the line of limbers, abreast of the lead drivers; the musicians on the right of the guidon, all boot to boot.

The chiefs of section cause all limber, caisson, and wagon chests to be opened for inspection.

When acting as inspector the captain inspects the chiefs of platoon from right to left; passes by the rear of the battery to the post of the first sergeant and inspects him; thence by the rear of the battery to the right flank, where he returns saber and inspects the musician and guidon.

He goes to the right section of the right platoon and inspects the section, commencing with the chief of section, passing in order to the caisson, the gun, and the limbers. He then similarly inspects the other sections in order from right to left.

When the captain commences the inspection of the right platoon the chiefs of the other platoons cause their platoons to stand at ease, calling them to attention as the captain approaches their platoons. Each chief of platoon accompanies the captain during the inspection of his platoon. As soon as a platoon is inspected its commander causes it to take the march order and then to stand at ease. The platoon commander faces his platoon while at ease.

The inspection being completed, the captain limbers front and rear and commands: 1. **Form double section line**, 2. **MARCH**.

At the second command the first and second platoons execute the movement (568); the chiefs of the other platoons move their platoons in double section up on the line established by the caissons of the gun sections.

731. The battery carries for inspection every article that is prescribed as part of its regular equipment and for which there is a specially designated place.

732. Should the inspector be other than the captain, the latter, having prepared his battery for inspection and taken his post, salutes when the inspector arrives in front of him. The inspector returns the salute, inspects the captain, and then inspects the battery in the order just described. As soon as inspected the captain returns saber and accompanies the inspector.

Section 17. Firing Instruction.

THE CANNONEER.

METHOD OF INSTRUCTION.

638. In view of the great importance of instruction of this character, it is begun as soon as the recruits join the battery,

and is continued, in addition to other instruction, until the cannoneers are thoroughly skilled in their individual duties. It will often be found advantageous to give the older cannoneers instruction of this kind from time to time.

839. Care must be taken to impress upon the recruits the importance of the instruction of cannoneers and to maintain their interest. The time spent in thoroughly training the individual cannoneer in the operation of the matériel will result in increased rapidity and accuracy of the gun squad as a whole.

840. The instruction of cannoneers and of gun squads will be under the immediate supervision of one or more battery officers selected for this work.

841. The permanent gunners and men skilled in the duties of Nos. 1 and 3 can be used to advantage in the instruction of the recruits. By assigning particular details of instruction to the older men and by causing the recruits to pass from one to the other of the instructors the instruction is expedited and uniformity is secured. The officer in charge must be careful that the instructors are accurate in their explanations and that they insist upon exact performance of the various duties.

842. During instruction in the individual duties in the service of the piece special stress must be laid on the necessity for accuracy. The recruits should be made to understand thoroughly that speed is purely a matter of practice, but that accuracy can only be obtained by forming the habit of exactness from the beginning. Rapidity is increased by insisting that each individual performs his duties in regular sequence.

843. To provide variety and so to maintain interest, instruction in the duties of the gun squad (929-1043) may be begun after a few days of instruction in the duties of cannoneers; but the last-mentioned instruction must not be curtailed. The keeping of records as to the time required by each cannoneer to perform the various duties and of the errors made not only stimulates interest but furnishes an intelligent basis upon which to select men for permanent assignment to duties.

INSTRUCTION IN MATÉRIEL.

844. The instruction begins with the first drills of the cannoneer, and is carried on during the intervals of more advanced

work. It is usually conducted in the park and should be practical in its nature, involving a careful and painstaking description, supplemented by actual demonstration of the method of operation of the particular element of the matériel being described. It is continued until there is acquired an intimate knowledge of the matériel in use in the battery, embracing such subjects as the following:

1. Nomenclature of the principal parts of the piece and calisson.
2. Purpose and operation of the different parts of the gun and carriages; for example, the application of the brakes.
3. Description and use of sights and quadrants, their attachment and manipulation.
4. Kinds of projectiles and the special uses of each.
5. Name and objects of the principal parts of fuzes and fuze setters, and their mode of operation.
6. Disassembling and assembling those parts of the matériel which frequently require cleaning and repair.
7. Transferring sights and quadrants between their traveling and firing positions.
8. Names of tools and accessories, where they are carried, and how they are used.

DUTIES IN DETAIL OF THE GUNNER.

§45. The duties of the gunner in the service of the piece are:

1. To set the deflection.
2. To apply the deflection difference.
3. To set the range.
4. To level the cross-level bubble on the sight-shank socket.
5. To give the direction to the piece.
6. To give the elevation in direct laying.
7. To call ready.
8. To move his head out of the way of the sight before the piece is fired.
9. To give the command to fire the piece.
10. To measure a deflection.

THE DEFLECTION.

§46. The deflection is the horizontal angle between the line of sight and the axis of the bore. There are two sights—the

panoramic sight and the peep sight. The panoramic sight is habitually used except in fire at will (1008).

847. The panoramic sight is so constructed that any horizontal angle can be laid off by it, and that by changing its setting the gunner can look in any horizontal direction. The sight has two scales. The limb of the instrument is divided into 64 equal parts. The even-numbered divisions are marked in figures. The smaller scale on the left side of the body of the instrument is divided into 100 equal parts, and is called the micrometer. A complete turn of the micrometer changes the reading of the limb by one division. The complete circumference is, by this arrangement, divided into 6,400 equal parts, and the least reading is one of these parts, called a mil. A deflection of 1 mil corresponds to a deviation at the objective of one one-thousandth of the range. Hence a difference of 1 mil in deflection is equivalent to 1 yard in direction at 1,000 yards from the gun, to 1½ yards at 1,500 yards, and so on.

When the panoramic sight is set at zero the vertical plane through the line of sight is parallel to the axis of the bore.

848. To set off a deflection on the panoramic sight: The gunner turns the rotating head of the instrument until the number of hundreds of the setting is shown by the index of the limb and the number of tens and units, if any, by the index of the micrometer.

If, in setting the deflection, the rotating head of the instrument has to be moved through a small angle only, the slow-motion screw is used. But if the reading given requires a large angular movement, the slow-motion mechanism is ungeared and the rotating head is turned around to the approximate position by hand. The slow-motion mechanism is then thrown in gear and used to set off the exact setting.

849. The gunner is practiced in setting deflections on the panoramic sight by command. Thus, for example: **Deflection, 1640.**

The gunner brings the index of the limb between the divisions marked "16" and "17" on the limb, then turns the micrometer until its index reads 40.

The instructor verifies the setting.

850. The graduations on the deflection scale of the peep sight correspond to those on the panoramic sight, the unit of the

scale being 1 mil. When set at 0 (6,400) the vertical plane through the line of sight is parallel to the axis of the bore. Toward the left the readings increase, the maximum reading being 45 mils; toward the right the readings decrease, the minimum reading being 6,355 mils.

To set off a deflection on the peep sight: The gunner turns the peep-sight screw head with his left hand until the index is opposite the desired graduation.

He is practiced in setting off deflections as before (849).

851. To throw the projectile to the left, increase the deflection. To throw the projectile to the right, diminish the deflection.

The captain changes the direction by commanding: **Right (Left) (So much)**. The command **Right (Left)** indicates the direction in which the captain wishes to throw the projectile.

The gunner is practiced in setting off a new deflection. Thus, the reading being 1620, **Left 20**, the gunner at once sets 1640.

THE DEFLECTION DIFFERENCE.

852. The training of the gunner in applying the deflection difference (955 et seq.) is begun when he is expert in setting off the deflection.

THE RANGE.

853. The range of a target is the distance in yards from the gun to the target.

854. The range scale on the sight shank is graduated from 100 to 6,500 yards, the least reading being 50 yards. The scale may be readily set by eye to read to 25 yards.

To set off a range on the sight shank: The gunner moves the sight shank up or down in its socket until the desired graduation is opposite the index. In setting the range he is careful to lower his head so as to look squarely at the scale and the index.

The sight shank is moved up or down by means of a scroll gear operated with the right hand. If a considerable movement of the shank is necessary this mechanism is ungeared by drawing outward the scroll-gear handle with the right hand; the shank is then raised or lowered with the left hand until

the desired graduation is near the index. The scroll-gear mechanism is then thrown in gear and utilized to set the scale at the exact setting desired.

855. The gunner is practiced in setting the sight for range, thus: The sight shank being in its socket, the instructor commands, for example, **2700**.

The gunner sets the sight as just described and the instructor verifies the setting.

THE CROSS LEVEL.

856. To center the bubble of the cross level: The gunner, with his left hand, turns the leveling screw on the sight-shank socket until the bubble is centered.

The centering of this bubble is necessary to avoid errors in the direction of the gun due to a difference in level of the gun wheels.

THE DIRECTION.

857. To give the direction to the piece: The gunner traverses the piece on the carriage until the vertical cross hair of his panoramic sight is on the target or the aiming point. He habitually operates the traversing gear with his left hand. When he finds that he can not traverse the piece sufficiently to bring the vertical cross hair on the aiming point or target, he commands: **Muzzle right (left) (893-900)**. Immediately upon giving this command the gunner brings his piece back to the center of traverse, except that in the case of fire at moving targets the muzzle of the gun is moved as far as it will go in the direction opposed to that of the motion of the target.

858. The gunner is practiced in the manipulation of the traversing gear and in bringing the vertical cross hair accurately on the aiming point. He must form the habit of turning the traversing handwheel in a clockwise direction to throw the cross wires to the left, and vice versa. He must also form the habit of bringing the gun to the center of traverse whenever it is necessary to shift the trail.

859. When the gunner gives the direction only, the method of laying is indirect. The signal that indirect laying is to be used is the command: **Aiming point (So and so)**.

360. The gunner is practiced in his duties of laying for direction only as follows:

The gunner being seated on his trail seat at the piece unlimbered, the sights in their sockets, the bubble of the cross level centered, and the piece at the center of its traverse, the instructor commands, for example:

1. Aiming point, the chimney on that white house.
2. Deflection, 240.
3. 2400.

1. At the command for the deflection the gunner sets it off on his panoramic sight.

2. Sets off, approximately, the range announced.

3. Looks at the cross level and centers the bubble, if necessary.

4. Looks through the sight and operates the traversing mechanism so as to bring the vertical cross hair on the aiming point.

5. Calls ready when he has laid the gun accurately for direction.

The gunner takes care not to touch the elevating gear in this method of laying. The approximate elevation is given by the instructor or an assistant. The chief of section causes the trail to be shifted until, when the gunner has set off the deflection, a side face of the rotating head of the sight is in line with the aiming point.

The instructor verifies the sight setting and the centering of the cross level bubble and sees whether the sight is accurately directed upon the aiming point.

If the piece has been laid for a given deflection, the instructor may command, for example: **Right (Left), 20.**

The gunner applies the correction to the old deflection and lays the piece as explained above.

THE ELEVATION.

361. To give the elevation to the piece, the gunner turns the elevating handle until the horizontal cross hair is on the bottom of the target.

The gunner is practiced in the manipulation of the elevating gear. He must form the habit of turning the handle in a clockwise direction to increase the elevation and, therefore, the range and vice versa.

862. When the gunner gives both the direction and the elevation, the method of laying is direct. The signal that direct laying is to be used is the command **Target (So and so)**.

863. The gunner is practiced in the duty of laying for both direction and range as follows:

The gunner, being seated on his trail seat at the piece unlimbered, the sights in their sockets, the bubble of the cross level centered, the piece at the center of its traverse, the instructor commands, for example:

1. **Target, that gun.**
2. **Deflection, 10.**
3. **2400.**

At the indication of the target an assistant gives the piece the general direction under the supervision of the chief of section.

As the commands are given the gunner—

1. Sets off the deflection ordered.
2. Sets off the range ordered.
3. Centers the cross level bubble, if necessary.
4. Looks through the sight and operates the traversing and elevating mechanism so as to bring the line of sight on the bottom of the target.
5. Calls **ready** when the gun is accurately laid.

The instructor verifies the sight settings, the centering of the bubble of the cross level, and sees whether the gun is laid accurately upon the target.

864. Whatever the method of laying, the gunner must always see that the gun is at the center of its traverse whenever it is necessary to shift the trail, except when firing at moving targets. This centering of the gun in its traverse and the accurate establishment of the general direction avoid frequent shifting of the trail and consequent loss of time which would otherwise result.

THE READY.

865. The call **ready** by the gunner indicates to the chief of section that the piece is accurately laid and is ready to fire.

TO AVOID INJURY.

866. Unless the gunner is careful to move his head out of the way of the sight before the gun is fired, the shock of discharge may bring the sight against his eye with sufficient force to injure it.

THE COMMAND TO FIRE.

867. The gunner invariably gives or repeats the command fire in actual or simulated firing, so as to insure his piece being fired at the proper time.

TO MEASURE A DEFLECTION.

868. The gun being established in direction by direct laying or otherwise, the deflection may be measured by turning the rotating head of the panoramic sight until the vertical cross hair is on the aiming point. The reading of the instrument is then the deflection sought.

869. The gunner is practiced in measuring the deflection as follows:

The gun being laid in direction on any target with zero deflection and the gunner seated on his trail seat, the instructor commands, for example:

1. Aiming point, that clock tower.

2. MEASURE THE DEFLECTION.

1. The gunner turns the rotating head of the panoramic sight until the vertical cross hair is on the designated aiming point.

2. He then reads and announces the deflection, thus: Deflection, 490.

The instructor verifies the reading and sees whether the sight is accurately directed upon the aiming point.

DUTIES IN DETAIL OF No. 1.

870. The duties of No. 1 in the service of the piece are:

1. To set and release the brake.
2. To open the breech.
3. To set the site on the quadrant.

4. To set the range on the quadrant.
5. To center the cross level bubble of the quadrant.
6. To close the breech.
7. In indirect laying, to give the levation.
8. To call set.
9. To fire the piece.
10. To measure the site.

THE BRAKE.

871. To set the brake, No. 1 grasps the brake-lever handle, pulls the lever down until the brake shoes come firmly against the wheels, and then swings the handle in until the lever engages in the rack.

872. To release the brake, No. 1 grasps the handle and pulls the lever so as to tighten the brake somewhat and so enable him to release the lever from the rack by throwing the handle to one side. Having released the lever from the rack, he pushes the handle up until the brake shoes are well away from the wheels.

873. No. 1 sets the brake as soon as the piece has been given the general direction. Whenever the trail has to be shifted No. 1 releases the brake and sets it again as soon as the trail has been reestablished.

THE BREECH.

874. To open the breech, No. 1 grasps the operating lever with his left hand and compresses the lever latch. He then draws the lever to the rear and right, thus swinging the block to the right. The lever should be drawn sharply so as to give the ejector sufficient force to throw the cartridge case clear of the gun.

875. No. 1 opens the breech as soon as the gun is in position and prepared for action and keeps it open at all times, except when the piece is loaded, until the command for march order (942) or limbering (202-203) is given, when he closes it. He is careful to see that the block remains fully away from the breech so that it will not interfere with loading.

In opening the breech after firing the piece, No. 1 half rises from his seat and, leaning to the rear, opens the breech as the piece returns into battery.

THE SITE.

876. The site is the angle between a horizontal plane and the line from the gun to the target. It is measured in mils and a difference of one mil in site corresponds to a difference in level between the gun and the target of one one-thousandth of the range.

877. On the right side of the body of the quadrant is the level scale the divisions of which are marked 2, 3, 4, and 5. Above the level scale at the upper end of the micrometer screw is the level micrometer scale which is divided into 100 equal parts. The site is set off on these scales. A complete turn of the micrometer changes the reading of the level scale by one division. One division on the micrometer is one mil; one division on the level scale is therefore 100 mils and its graduated divisions are called 200, 300, etc. Three hundred corresponds to targets at the level of the gun; below 300 corresponds to targets below the gun; and above 300 to those above the gun.

878. To set off the site, No. 1, with his right hand, turns the micrometer screw until the number of hundreds of the setting is shown by the level index and the number of tens and units is shown by the index of the micrometer. It is necessary in setting the site that No. 1, after setting the level scale, place his head so as to look squarely down on the micrometer. He must form the habit of moving the micrometer scale in a clockwise direction to increase the site setting, in a counterclockwise direction to diminish the setting.

879. No. 1 is practiced in setting sites by command.

The quadrant being in its socket, the instructor commands, for example: Site, 315.

No. 1 turns the micrometer screw until the index of the level scale is between the graduation marked 3 and the graduation marked 4, and the index of the micrometer reads 15.

The instructor verifies the setting.

THE RANGE.

880. In indirect laying the range is set off on the range disk of the quadrant. The range disk is graduated from zero to

6,500 yards. The least reading on the scale is 50 yards, but the range may readily be set by eye to a least reading of 25 yards.

881. To set off a range, No. 1 turns the scroll gear handle with the left hand until the index is opposite the designated range. In setting a range, it is important that No. 1 place his head so that his eye will be squarely opposite the range scale.

If it is necessary to make a considerable change of reading, the slow-motion mechanism is ungeared by drawing out the handle. By pushing up or down, the scale is moved until it is near the desired setting. The tension on the handle is then released and the slow-motion mechanism is thrown into gear and used to effect an accurate setting.

882. No. 1 is practiced in setting ranges by command.

The quadrant being in or out of its seat the instructor commands, for example: **2550**. No. 1 manipulates the handle with his left hand until the index is brought opposite the designated reading.

The instructor verifies the setting.

THE CROSS LEVEL.

883. To center the bubble of the cross level, No. 1 turns the cross level screw with the right hand. The centering of this bubble is necessary in order to avoid errors in the elevation of the piece due to a difference in level of the gun wheels. No. 1 is careful to keep the cross bubble centered at all times.

THE BREECH.

884. To close the breech, No. 1 places the middle of the palm of his open left hand against the operating lever, pushes the lever to the left, and swings the block smartly to its seat.

THE ELEVATION.

885. When the quadrant is set and the elevation is given by No. 1 the laying is said to be indirect. The signal that indirect laying is to be used is the command: **Aiming point (So-and-so)**.

The signal that direct laying is to be used and that consequently No. 1 is not to set the quadrant or give the elevation is

the command: **Target (So-and-so)**. In direct laying No. 1 must be careful not to touch the elevating mechanism.

886. To give the elevation to the piece, No. 1 operates the elevating handle until the bubble of the elevation level is centered.

Turning the elevating handle clockwise moves the bubble to the front and increases the elevation and the range, and vice versa. It is important that this become second nature to No. 1.

887. No. 1 may be practiced in his duties of laying for elevation as follows:

No. 1 being seated on his trail seat, at the piece unlimbered, the quadrant in its seat and the cross level bubble centered, the instructor commands, for example:

1. Site 280.

2. 3400.

1. At the command for the site No. 1 sets it off with his right hand.

2. Sets the range with his left hand.

3. Centers the cross level bubble, if necessary.

4. Centers the bubble of the elevation by turning the elevating handle with his right hand.

5. Calls set when he has laid the piece accurately for elevation.

The instructor verifies the settings and the centering of the bubbles.

THE SET.

888. The call set by No. 1 indicates that so far as he is concerned the piece is accurately laid.

As soon as he calls set No. 1 grasps the firing handle with the left hand.

When the chief of section cautions with the lanyard, No. 1 attaches the lanyard to the firing mechanism and, after calling set, steps clear of the wheel, holding the end of the lanyard in his left hand.

TO FIRE.

889. To fire the piece, No. 1 at the command of his gunner pushes the firing handle down with his left hand, so as to release the firing pin. It is important that No. 1 form the habit

of using only his left hand to fire the gun. This makes it impossible for him to have any part of his body in the way of the gun during recoil.

In firing with the lanyard, No. 1 pulls on the lanyard until the firing pin is released. The lanyard is not used except when the ground is such that the trail spade is not easily seated and then is usually necessary only for the first shot.

TO MEASURE THE SITE.

890. The gun is first laid directly on the target by the gunner, who sets the sight shank at any convenient range, the deflection at zero, and brings both the cross hairs on the target by traversing and elevating the piece. No. 1 then sets the range disk of the quadrant at the same range as that on the sight shank and centers the bubble of the elevation level by turning the micrometer screw. The site reading is the site of the target.

891. No. 1 is practiced in the duty of measuring the site as follows:

The gun being accurately laid on the target by means of the panoramic sight, the sight shank being set at any convenient range, 2700, for example, the instructor commands:

1. Measure the site.

2. 2700.

1. At the command 2700, No. 1 sets 2700 on his range disk.

2. Centers the cross level bubble, if necessary.

3. Centers the bubble of the elevation level by turning the micrometer screw.

4. Calls out the site reading, thus: Site 330.

The instructor verifies the quadrant settings and the centering of the bubbles.

DUTIES IN DETAIL OF No. 2.

892. The duties of No. 2 in the service of the piece are:

1. To shift the trail so as to give the general direction to the piece.

2. To throw the empty cartridge cases out of the way of the gun squad.

TO SHIFT THE TRAIL.

893. For the assistance of No. 2, the upper edges of the top and main shields should be graduated in mils, and each division of 50 mils should be marked. No. 2 should also be instructed as to the value in mils of the width of the trail spade and of the float.

With the origin at the middle of an upper edge the divisions on the shields should be for the average case with the 3-inch field gun 6, 12, 18.1, and 24.5 inches from the origin to indicate divisions of 50, 100, 150, and 200 mils, respectively. The middle of the top of the tire is approximately 250 mils from the center division.

A shift of the trail by the width of its mark in the ground corresponds to a change of direction of about 150 mils.

A shift of the trail by the width of the float corresponds to a change of direction of about 220 mils.

894. To shift the trail, No. 2 stands immediately in rear of the trail handspike, feet about 18 inches apart, and grasps the handspike with both hands.

895. When the target is visible and direct laying is used, No. 2 sights along the barrel and shifts the trail so as to point the gun directly at the target. Unless the target is moving it should not be necessary to shift the trail during the firing. In the case of moving targets No. 2, after once pointing the piece at the target, does not shift the trail until he gets the gunner's command: **Muzzle right (left)**. He then shifts the trail so as to bring the piece again on the target.

Whenever it is necessary to shift the trail in direct laying, No. 2 watches the gunner and does not complete the shifting of the trail until the gunner has traversed the gun to the center or to one extreme of its movement on the carriage (864).

896. No. 2 is practiced in pointing the piece directly at the target.

The piece being in position and No. 2 at the trail handspike, the instructor commands, for example:

Target, that house.

No. 2 points the piece quickly on the designated target.

The instructor verifies the pointing with the panoramic sight set at zero deflection.

897. When the piece is laid for direction by the use of an aiming point (indirect laying), No 2 gives the original direction to the piece by shifting the trail in accordance with the commands or signals of the chief of section, or of some one representing the chief of section.

To signal to No. 2, the chief of section extends his arm toward the trail, palm of the hand turned and fingers pointing in the direction in which the trail is to be moved. To indicate that the direction is correct and that the trail is to be lowered, the chief of section commands: **Trail down**; the corresponding signal is the bringing of the extended arm sharply to the side.

898. No. 2 is practiced in giving the piece its initial pointing in indirect laying. In these exercises an aiming point is taken, the sight is set at an appropriate reading and the chief of section, looking along a side of the rotating head, causes the gun to be given its proper direction.

No. 2 should also be instructed as to what should be the approximate direction of the piece when the sight, set at different deflections, is directed on an aiming point.

899. After the initial direction has been given, No. 2, in indirect laying, shifts the trail whenever the deflection is changed by 50 mils or more and also whenever he gets the command: **Muzzle right (left)**.

No. 2 must thoroughly understand that shifting the trail to the right (left) moves the muzzle to the left (right).

900. No. 2 is practiced in shifting the trail at the command for a deflection change of 50 mils or more.

The piece being in position and No. 2 at the trail handspike, he sight directed on an aiming point, the instructor commands, or example:

1. **Right 100.**
2. **Trail down.**

1. At the command **Right 100**, No. 2, standing in his position or shifting the trail, locates an object, as far away as possible, which is in line with the graduation marked 100 on the right of the top of the shield, and shifts the trail to the left so as to

bring the center division on the shield in line with the object selected.

2. At the command or signal trail down No. 2 lowers the trail.

The instructor makes the appropriate change in the deflection setting and verifies the accuracy of the work of No. 2.

If it be impracticable to select a definite object upon which to sight, No. 2 judges the amount by which the trail must be shifted by the width of the trail spade or float (893).

EMPTY CARTRIDGE CASES.

901. To keep the empty cartridge cases out of the way of the gun squad, No. 2 catches the cases as they are ejected from the gun and throws them a little to the rear of the caisson wheel farthest from the piece.

DUTIES IN DETAIL OF No. 3.

902. The duties of No. 3 in the service of the piece are:

1. To set the corrector.
2. To set the range on the fuze setter.
3. To set the fuze when the hand fuze setter is used.

THE BRACKET FUZE SETTER.

903. The fuze setter is a device for setting time fuzes so that the projectiles will burst in the air at such height as may be desired. It has a range scale and a corrector scale.

The range scale is graduated in yards from 0 to 6400, its least reading being 50 yards. When a shrapnel is turned in the fuze setter, the fuze is set so that the projectile will burst, after being fired, at about the range set off on the range scale.

The corrector scale is uniformly graduated into 60 divisions. Every tenth division is numbered in figures 0, 10, 20,—60. The purpose of the device is to change the time of burning of the fuze, independently of the range scale, and thus to control the point at which the projectile bursts. Under normal conditions a change of fuze setting by one unit of this scale produces a variation of about 1 mil in the height of burst of the projec-

tile. The middle graduation of the scale, 30, corresponds theoretically to the normal height of burst, 3 mils.

904. Increasing the corrector reading shortens the time of burning of the fuze and hence raises the point of burst of the projectile; decreasing the corrector reading lengthens the time of burning of the fuze and hence lowers the point of burst of the projectile.

The corrector scale thus affords the means of correcting an observed error in height of burst and of adjusting the mean point of burst at the proper height.

905. To set the corrector, No. 3 turns the corrector worm knob with the right hand so as to bring the movable index opposite the corrector reading ordered. It must become habitual with No. 3 to turn the corrector knob in a clockwise direction to decrease the reading, and to turn the knob counterclockwise to increase the reading.

906. To set the range, No. 3 turns the range worm crank, with either hand, so as to bring the range reading opposite the fixed index of the range scale. It must become habitual with No. 3 to turn the range crank clockwise to increase the reading, and to turn the crank counterclockwise to decrease the reading.

907. In setting either scale, No. 3 must be trained to place his head so that he looks squarely at the scale and its index.

908. No. 3 is repeatedly practiced in setting the scales of the fuze setter by command.

The caisson being in position with the fuze setter lowered and No. 3 being seated at the fuze setter with his back to the inside of the right wheel of the caisson, the instructor commands, for example:

1. Corrector 28.

2. 3600.

1. No. 3 sets off the corrector as soon as it is announced.

2. Sets the range scale at the range ordered.

The instructor verifies the settings.

909. The corrector having once been set, changes in the setting are usually made at the command: Up (Down) (So many).

The command up means that the corrector reading is to be increased; down means that the corrector reading is to be diminished.

No. 3 is practiced in this method as follows:

The corrector having been set at 28, the instructor commands, for example:

1. Up 5.

2. 3400.

1. No. 3 increases the corrector reading by 5 points and, accordingly, sets corrector 33.

2. Sets the range at 3400.

The instructor verifies the settings.

910. Even though time fire is not being used, No. 3 always keeps his scales set according to the commands. If percussion fire is being used, No. 3 is thus always ready to pass to time fire.

THE HAND FUZE SETTER.

911. The hand fuze setter is used only when the bracket fuze setter is not available. No. 3 sets the scales in a manner similar to that described for the bracket fuze setter. He also sets the fuze, No. 5 holding the round.

To set the fuze with the hand fuze setter, No. 3 engages the fuze setter on the fuze and turns the fuze setter to the right with a steady and uniform motion until the lug on the fuze comes firmly against the fuze-setter stop.

DUTIES IN DETAIL OF No. 4.

912. The duties of No. 4 in the service of the piece are:

1. In time fire to complete the setting of the fuze.
2. To insert the round in the breech.
3. In volley fire to call out the number of the round.

TO COMPLETE THE FUZE SETTING.

913. The signal that time fire is to be used is the command: Corrector (So much). The signal that percussion fire is to be used is the command: Shell, or Percussion.

914. In time fire, to insure correct setting of the fuze, No. 4 turns the projectile to the right before removing it from the fuze setter, being careful not to turn it until the scales have been set.

In turning the projectile, No. 4 stands slightly to the left and rear of the fuze setter facing to the right front. His left hand, back down, grasps the round at or near the forward end of the cartridge case. The palm of the right hand is placed on the base of the cartridge case, the fingers grasping the edge of the base. While turning the projectile, No. 4 takes care to hold the body of the projectile down on the guide and to keep the fuze well engaged by a steady pressure on the base of the cartridge case with the right hand. The projectile should be turned with a steady and uniform motion until the lug on the fuze comes firmly against the fuze setter stop.

TO INSERT THE ROUND.

915. In time fire: Having accurately set the fuze, No. 4 withdraws the round from the fuze setter, taking care to draw it straight out so as to avoid any possibility of changing the setting. At the same time No. 4 slips his left hand toward the point of the projectile until it is about at the center of gravity of the round. As soon as the fuze is clear of the body of the fuze setter No. 4 springs toward the breech, stepping off with the right foot. As he approaches the gun he raises the point of the projectile slightly above the base and allows the weight of the round to be supported by the left hand. The fingers of the right hand are rigidly extended, the palm of the hand being kept firmly pressed against the base of the cartridge case. Taking position to the left and rear of the breech, the front of his body being parallel to the axis of the bore, eyes on the breech recess, No. 4 inserts the nose of the projectile in the chamber and shoves it forward, the extended right hand being brought sharply against the face of the breech. The closing of the breech insures the proper seating of the projectile. As soon as he has inserted the round, No. 4 quickly resumes his position at the fuze setter.

916. When the hand fuze setter is used, and in percussion fire, No. 4 receives a round of ammunition directly from No. 5 (919) and inserts it as above prescribed.

917. In percussion fire No. 4, after taking a round from No. 5, stands at his position at the breech and loads the piece as soon

as the previous round has been fired. No. 4 is thus always ready to load the piece without loss of time. He takes care to stand clear of the breech during recoil.

918. No. 4 is practiced in setting the fuse and in loading the piece. His training in his duties in volley fire is not begun until drill in the duties of the gun squad combined is commenced.

DUTIES IN DETAIL OF No. 5.

919. The duties of No. 5 in the service of the piece are:

1. To take ammunition from the chest.
2. When the bracket fuze setter is being used, to insert the round in the fuze setter and to set the fuze.
3. When the hand fuze setter is used, to hold the round while No. 3 sets the fuze.
4. To pass the round directly to No. 4 in percussion fire, and when the hand fuze setter is used in time fire.

TO REMOVE A ROUND FROM THE CHEST.

920. To take a round from the chest, No. 5 places himself to the left rear of the round selected, grasps the edge of the cartridge case with the fingers of the right hand, pulls the round to the rear, across the front of his body, and catches the body of the projectile with the left hand. As soon as he is relieved of one round No. 5 immediately takes another from the chest.

THE BRACKET FUZE SETTER.

921. When the bracket fuze setter is used, No. 5 strips off the waterproof hood of the fuze. He then inserts the point of the projectile in the fuze setter, taking care that the lug nearest the point of the fuze engages in the groove in the fuze setter, and sets the fuze for the settings then on the fuze setter as prescribed for No. 4.

922. Having set the fuze, No. 5 immediately takes another round from the chest, strips off the waterproof hood, and stands ready to insert the round in the fuze setter as soon as No. 4 has withdrawn the previous round.

THE HAND FUZE SETTER.

923. When the hand fuze setter is used, No. 5 holds the round while No. 3 sets the fuze. Nos. 3 and 5 should occupy the same relative positions that they have in using the bracket fuze setter. As soon as No. 5 has withdrawn the round from the chest and stripped off the hood, he faces to the right rear and kneels on the right knee. The round is placed with the base of the cartridge case against the right knee, the edge resting on the ground. The point of the projectile is up so that the axis of the round is pointed in the direction of No. 3's head. No. 5 grasps the round with both hands, the right arm resting on the right thigh, back of the right hand up. The left arm rests against the outside of the left leg, back of the left hand down.

TO PASS A ROUND TO NO. 4.

924. When he passes a round to No. 4, No. 5 places the right hand under the center of the cartridge case and the left hand under the center of the projectile, backs of both hands down. The round is held horizontally and well away from the body, the base of the cartridge case being presented to No. 4. No. 4 receives the round by passing his left arm under the right arm of No. 5, grasping the round between the hands of No. 5, at the same time grasping the base of the cartridge case with the right hand.

DUTIES OF NOS. 6 AND 7.

925. Nos. 6 and 7 have no specific duties in the service of the piece after it is established in position. They act as spare cannoneers.

926. Upon going into action, Nos. 6 and 7 are utilized for the construction of concealment for the carriages, for line guards on the telephone lines, for the resupply of ammunition, etc. This work is done under the immediate supervision of the executive or his assistant.

TO MOVE BY HAND THE CARRIAGES UNLIMBERED.

937. 1. Pieces (Caissons) forward (backward), 2. **MARCH**, 3. **HALT**.

Each piece: The gunner and No. 2 grasp the trail handles, the gunner the left, No. 2 the right handle; Nos. 1 and 3 the right and left wheels, respectively; Nos. 4 and 5 place themselves so as to work advantageously at the breech of the gun in moving forward, at the muzzle in moving backward. Nos. 6 and 7 assist at the nearest wheels. At the command **march**, all working together move the carriage in the direction indicated. At the command **halt**, they stop the carriage and resume their posts.

Each caisson: Executed as explained for the piece, except that Nos. 4 and 5 are at the trail of the caisson and that the gunner and No. 2 work in rear of the caisson chest in moving to the front, against the footboards in moving to the rear.

PREPARATION FOR ACTION AND MARCH ORDER.

TO PREPARE FOR ACTION.

938. The carriages being in position unlimbered: **PREPARE FOR ACTION**.

Each member of the gun squad performs his duties in the order given below:

Gunner: (a) Removes the hood from the sight bracket;

(b) Releases the traversing and elevating lock and operates the traversing and elevating gear;

(c) Removes the sight shank from its case and places it in its socket, setting the range at 3,000 and the peep sight deflection at zero;

(d) Takes the panoramic sight from its case and places it in its seat, making sure that the sight is clamped and that the deflection is set at zero;

(e) Raises and secures the top shield, with the assistance of No. 1;

(f) Seats himself on his seat.

No. 1: (a) Removes the quadrant from its case and places it in its seat; centers the cross level bubble;

(b) Sets the range at 3,000 and the sight at 300, and brings the range bubble to the center;

(c) Equips himself with a lanyard and a wiping cloth;

(d) Operates the breech mechanism, examines the breech block, bore, and chamber, cleaning any parts requiring it, leaving the breech open, except when the gun is loaded;

(e) Assists the gunner in raising and securing the top shield;

(f) Seats himself on his seat.

No. 2: (a) Removes the breech cover;

(b) Turns back the trail handspike and engages it;

(c) Runs around to the right of the piece and assists No. 3 to lower the piece apron;

(d) Distributes tow or waste to the cannoneers for use in their ears;

(e) Seats himself on the handspike.

No. 3: (a) Runs around the left of the caisson and removes the muzzle cover;

(b) Removes the front sight cover and adjusts the sight in its firing position;

(c) Lowers the piece apron, with the assistance of No. 2;

(d) Seats himself at the fuze setter, with his back to the right caisson wheel;

(e) Sets his scales at corrector 30, range 3,000.

No. 4: (a) Assisted by No. 5, lowers the caisson apron;

(b) Lowers the fuze setter;

(c) Assisted by No. 5, raises the caisson door;

(d) Stands ready to serve ammunition.

No. 5: (a) Assists No. 4 to lower the caisson apron;

(b) Assists No. 4 to raise the caisson door;

(c) Puts a round of shrapnel in the fuze setter, setting the fuze;

(d) Stands ready to serve ammunition.

The cannoneers report to their chief of section if any parts of the matériel are not in working order.

939. The carriages, limbered, are habitually prepared for action before reaching the firing position. The duties of the cannoneers are the same as at the carriages unlimbered, except that after the examination of the elevating and traversing gear

the piece is secured by the traveling lock; the trail handspike is not turned back; the breech is closed; the firing pin is released; the fuze setter is not lowered, nor is a round put in the fuze setter; the apron is not lowered; the caisson door is left closed; and the cannoneers do not take their posts for serving the gun. The gunner and No. 1 return the panoramic sight and the quadrant to their cases, unless special orders to the contrary are given.

Immediately after establishing the carriages the preparation for action is completed without command and the cannoneers take their posts for serving the piece.

940. If prepare for action has not been given before establishing the carriages in the firing position, that command is habitually given by each chief of section as soon as his carriages have been unlimbered and established. The instructor may, however, caution do not prepare for action when he wishes to drill the personnel in limbering and unlimbering only or in the details of preparation for action.

POSTS OF THE CANNONEERS, CARRIAGES UNLIMBERED AND PREPARED FOR ACTION.

941. In each squad, the gunner, seated on his seat facing the gun.

No. 1, seated astride his seat facing the gun.

No. 2, seated astride the trail handspike near the trail.

No. 3, seated with his back to the inside of the right caisson wheel, facing the bracket fuze setter, legs extended one on each side of the fuze setter.

Nos. 4 and 5, in rear of the caisson in a convenient position for the performance of their duties.

Nos. 6 and 7, abreast and in order from right to left, 5 yards in rear of the trail spade of their piece, awaiting orders.

Higher numbered cannoneers, if present, accompany the limbers.

In the Horse Artillery the two highest numbered cannoneers act as horse holders and take the lead horses to the rear with the limbers.

TO RESUME THE ORDER FOR MARCHING.

942. The carriages being prepared for action, to resume the order for marching: **MARCH ORDER.**

Each member of the gun squad performs his duties in the order given below:

Gunner: (a) Lowers and secures the top shield, with the assistance of No. 1;

(b) Sees that the deflection reading is zero, returns the panoramic sight to its case and secures the case;

(c) Replaces the cover on the sight shank and returns it to the trail box;

(d) Traverses and elevates the piece to the traveling position and fastens the traveling lock;

(e) Secures the hood over the sight bracket;

(f) Takes his post.

No. 1: (a) Assists the gunner in lowering and securing the top shield;

(b) Closes the breech; releases the firing pin;

(c) Returns the lanyard and wiping cloth to the trail box;

(d) Sets the range at 3000 and the site at 300;

(e) Returns the quadrant to its case and secures the case;

(f) Takes his post.

No. 2: (a) Assists No. 3 to raise and secure the piece apron;

(b) Turns down and secures the trail handspike;

(c) Replaces the breech cover and secures it;

(d) Takes his post.

No. 3: (a) Sees that the fuze of any round whose fuze has been set, is set back at safety;

(b) Sets fuze setter at range 3000, corrector 30;

(c) Raises and secures the piece apron, with the assistance of No. 1;

(d) Replaces the front-sight cover and adjusts the front sight in the traveling position;

(e) Replaces and secures the muzzle cover;

(f) Takes his post.

No. 4: (a) Assists in setting fuzes back at safety;

(b) Passes the round to No. 5;

(c) Assisted by No. 5, lowers and secures the caisson door;

- (d) Raises and secures the fuze setter;
- (e) Assisted by No. 5, raises and secures the caisson apron;
- (f) Takes his post.

No. 5: (a) Receives ammunition from No. 4 and stores it in the chest;

- (b) Assists No. 4 to lower and secure the caisson door;
- (c) Assists No. 4 to raise and secure the caisson apron;
- (d) Takes his post.

If it is intended to resume the fire, but in another position, so that the limbering of the carriage is necessitated, the command **MARCH ORDER** is not given. At the command for limbering the carriages are placed in the order described in paragraph 939.

THE FIRING BATTERY.

COMPOSITION, FORMATION, AND INSTRUCTION OF THE FIRING BATTERY.

944. The firing battery comprises the guns and caissons of the first five sections of the battery, with the personnel and animals assigned to their immediate service. It is under the direct command, or orders, of the captain.

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945. For the instruction of recruits the drill of the gun squads is at first carried on in the park. Later the instruction of the firing battery is carried on over all forms of terrain available.

In the field it is desirable that the guns be placed approximately in line with regular intervals of approximately 17 yards between adjacent gun wheels. It is more important that the intervals be regular than that they be exactly 17 yards. Each chief of section cautions (Such) piece, or, No. (So-and-so), as soon as his carriages have been established in position (47).

In the park the limbered carriages are formed in line or column of double sections, the caisson of each section being alongside of and at two yards interval from its piece, at such intervals or distances between sections as may be practicable. By the execution of action front (rear, right, or left) the car-

riages are placed in line in the firing position at sufficient intervals for the drill of the gun squads.

946. At the commencement of training of recruits in their duties in the firing battery, their instruction in the elementary principles of gunnery contained in this chapter will be begun. As the instruction progresses and the recruits are divided into classes, each class should be instructed in so much of the principles involved in **Service Firing** as the men of the particular class can thoroughly grasp.

DUTIES IN GENERAL OF THE NONCOMMISSIONED OFFICERS OF THE GUN SECTIONS.

950. Chief of gun section:

1. Commands his section.
2. Makes sure of the identification of his part of the target or of the aiming point.
3. Keeps informed of the firing data so as to be able to repeat any parts not understood by the cannoneers but does not repeat anything unless it is called for by a subordinate. If a chief of section does not understand any item of the firing data he asks the executive for it thus: Site? Corrector? etc.
4. In indirect laying whenever the trail has to be shifted, puts the gunner approximately on the aiming point by glancing along one side of the rotating head of the panoramic sight and causing the trail to be shifted until the side of the rotating head is in line with the aiming point (897).
5. Commands with the lanyard for the first shot when the ground is such that the trail spade is not easily seated, and sees that all the cannoneers step clear of the piece for the first shot.
6. Extends his right arm vertically as soon as the gunner has called ready, so as to indicate to the executive officer that the piece is ready to fire. The right arm is held vertical until his gunner commands fire.
7. Supervises and is responsible for all the details of correct service by his gun squad.

951. Gunner:

1. Performs his duties in the gun squad.

2. Commands muzzle right (left) when he has reached the limit of traverse of the gun on the carriage.

3. Commands fire so that his piece will be fired, after having been accurately laid, at the proper time.

DEFLECTION AND DEFLECTION DIFFERENCE.

955. Each gun in the battery must be so pointed that its projectile will fall in the direction of its part of the target.

956. The direction of each gun may be given by setting the sight at zero, then bringing the cross hairs on the target by shifting the trail and traversing the gun on the carriage.

Or, the direction of the gun may be given by setting the sight at a reading, called the **deflection**, previously determined and then bringing the vertical cross hair on a designated aiming point by shifting the trail and traversing the gun on its carriage.

957. When the guns are laid for direction by bringing the cross hairs on the target, each gunner sights at and his projectiles should fall on his own part of the target.

When the guns are laid for direction by bringing the vertical cross hairs on an aiming point it is usually necessary to give the guns different deflections in order that each piece may be brought on its own part of the target. The difference in deflections is called the **deflection difference**. It is usually small and is the same for any two adjacent pieces.

958. By opening out the guns like a fan, the front covered by the fire is increased; by closing in the guns, the front covered may be decreased. By increasing or diminishing the deflection difference, therefore, the front on which the projectiles fall may be increased or decreased at will.

The lines of fire of several pieces collectively directed form the **sheaf of fire**.

959. When an aiming point is used, the captain, assisted by his battery detail, determines the deflection for one of the pieces and the amount by which the other pieces must be opened out or closed in on this one in order that the shots may fall on the front desired.

The piece for which the deflection is determined or on which the others are to close or open is indicated by the number of

the piece given in the command: **On** (such) piece, **Open** (close) (so much). This piece is called the directing piece.

960. Since the deflection difference for any two adjacent pieces is the same, each gunner must multiply the deflection difference by the number of gun intervals between his piece and the directing piece in order to find the amount by which his deflection will differ from that of the directing piece.

961. The gunner of the directing piece does not change his deflection on account of the deflection difference.

In order to open out the sheaf the guns on the right of the directing piece must have their muzzles moved to the right and those on the left of the directing piece must have their muzzles moved to the left. Since decreasing the deflection moves the muzzle to the right and throws the shot to the right, each gunner on the right of the directing piece, in order to open the sheaf, must multiply the deflection difference by his number of intervals from the directing piece and subtract the result from the deflection announced. Since increasing the deflection moves the muzzle to the left and throws the shot to the left, each gunner on the left of the directing piece, in order to open the sheaf, must multiply the deflection difference by his number of intervals from the directing piece and add this result to the deflection announced.

962. Conversely, to close the sheaf on the directing piece, the gunners on the right must increase the deflection or add to it so as to throw the muzzles of their guns toward the directing piece, while those on the left must decrease the deflection or subtract from it in order to throw their muzzles toward the directing piece.

963. When the aiming point is in certain positions it may happen that the fire will be properly distributed on the target when the deflection of all the pieces is the same, or when the deflection difference is zero. The absence of any command **open** or **close** is the indication that all the pieces are to be laid with the same deflection.

964. After the first or subsequent firing, one of the guns may be directed on its part of the target while the others are not. In such cases the captain does not change the deflection but brings all the guns on the target by opening or closing on the gun which has the proper direction.

RANGE AND SITE.

972. As the distance from the guns to the target increases the guns must be pointed more and more above the line joining the gun and the target in order that the projectile may reach the target.

973. Since targets are not always at the level of the gun, but are frequently above or below this level, the actual inclination of the gun to the horizontal when the gun is laid on a target is not the elevation due to range of the target only, but is a combination of this elevation due to range and of the difference of level between the target and the gun. When the gunner sets his sight shank at the correct range and, looking through the sight, brings the horizontal hair on the bottom of the target he automatically gives the gun the correct elevation above the line joining the gun and the target. This elevation of the gun above the line from the gun to the target is affected by the range only, and does not vary with the height of the target.

974. When the gunner does not sight directly at the target, but lays the gun for direction by sighting at an aiming point, the gun elevation must be given by the quadrant. The quadrant, therefore, has devices by which the angular elevation due to range may be set off and by which to make allowance for the difference in level between the gun and the target.

The first is accomplished by the range disk, the operator setting the range announced opposite the index.

The second is accomplished by the site device, which the operator has only to set at the value announced.

The range and site data having been set off on the quadrant and the quadrant being in place on the gun, the operator elevates or depresses the gun until the bubble of the elevation level is centered. The proper combination of these two angular values is thus automatically made and the gun has the proper inclination to the horizontal to cause the projectile to reach the target.

975. The site is announced by the captain, Site (So and so).

Since the guns of a battery are usually on nearly the same level the site is usually the same throughout the battery. Sometimes, however, it becomes necessary to give a different site to the

several guns. In such cases the captain commands: **Site, No. 1 (So and so); No. 2 (So and so);** etc. The gunner of each piece sets the site indicated for his particular piece.

976. The range is announced for each salvo or volley.

984. The gun squads must know the kind of projectile and the fuze which are to be used. This is indicated to them by the commands: **Shell; or, Percussion; or, Corrector (So much); or, Up (Down) (So much).** The command **shell** indicates that shell are to be used. The command **percussion** indicates that shrapnel for percussion fire are to be used. Since shrapnel for percussion fire must have their fuzes set at safety and since the fuzes are carried at that setting in the chest, it is not necessary to use the fuze setter when the command **percussion** is given; but, as the gun squads must be ready to change from percussion to time fire, No. 3 always sets his range scale at the last range announced.

Corrector (So much); or, Up (Down) (So much) indicates time fire with shrapnel and that the fuzes must be set.

METHODS OF LAYING.

985. When it is possible for the gunner to see the target clearly and to aim directly upon the part of it which the fire of his gun is intended to reach, the gun may be laid by the gunner for both range and direction. This is called **direct laying**.

986. When it is impracticable for the gunner to aim directly upon the part of the target which the fire of his gun is intended to reach, the gun is laid by him for direction only. In this case an aiming point which can be clearly seen by the gunner is designated and a suitable deflection given, such that, when the line of sight is directed upon the aiming point, the gun will be directed upon the target. This is called **indirect laying**.

985. The gunners are trained in setting off the corrected deflection individually as well as during the instruction of the gun squads.

For example: 1. Deflection 1620, 2. On 1st piece, Open 10. All the gunners set 1620 as soon as it is announced. As soon as **On 1st piece, Open 10** is given the gunner of the 2d piece multi-

plies 10 by his interval (one) and adds the result (10) to 1630, and accordingly sets 1640. The gunner of the 3d piece multiplies 10 by his interval (two) and adds the result (20) to 1620, and accordingly sets 1640. The gunner of the 4th piece multiplies 10 by his interval (three) and adds the result (30) to 1620, and accordingly sets 1650.

The sights being set as above, for example, the command may be: On 3d piece, Close 5. The 3d piece becomes the directing piece and its gunner leaves his sight reading at 1640. The gunner of the 4th piece multiplies 5 by his interval (one), subtracts the result (5) from 1650, and accordingly sets 1645. The gunner of the 2d piece multiplies his interval (one) by 5, adds the result (5) to 1630, and accordingly sets 1635. The gunner of the 1st piece multiplies his interval (two) by 5, adds the result (10) to 1620, and accordingly sets 1630.

The instructor verifies the settings.

966. It is most important that all the gunners first set the deflection ordered and then apply the deflection difference. This method avoids errors and results in greater rapidity than is obtained should the gunner attempt to make all of his calculations and then to set off the resulting deflection.

967. It may be that the aiming point can be seen from only one piece. In such cases the executive, after announcing the deflection, commands: Lay on (Such) piece, designating the piece from which the aiming point can be seen. At this command each chief of section, except that of the piece designated, causes his gunner to turn his sight in the direction of the designated piece and his No. 2 to extend the rammer staff vertically in front of the object glass of the sight. The designated piece having been accurately laid at the indicated deflection, its chief of section causes the gunner to turn his sight, without traversing the piece, so that the vertical hair will bisect the rammer staff at the other pieces in succession and announces the reading, thus: No. (So and so), (So much). The chief of section of the piece which can see the aiming point then causes No. 2 to extend his rammer staff vertically alongside the sight.

As the reading for his piece is called off, each chief of section who is unable to see the aiming point subtracts 3,200 from the

reading announced if he is on the left of the piece from which the aiming point can be seen, or adds 3,200 to the reading if he is on the right. He then causes the gunner to set his sight according to the result thus obtained and to lay on the rammer staff at the designated piece. This results in the guns being laid so that the axes of the bores are parallel.

Each chief of section then selects his own aiming point and causes the gunner to measure the deflection (959).

968. The necessity for taking full advantage of cover for the concealment of the guns, especially from aircraft, may sometimes make it impossible to utilize a common aiming point or to see one piece from another. In such cases the executive causes the pieces to be pointed, by the compass or other means, as nearly as may be in the proper direction. One of the pieces is selected to fire a single round of time shrapnel so as to give a burst about 10 miles above the horizon visible from the guns and at as great a range as practicable. The remaining pieces are so elevated and the sights are so set as to enable each gunner quickly to turn the rotating head of his panoramic sight upon the burst without disturbing the laying of the piece. Each chief of section, having noted the deflection, causes the gunner to turn the sight on any suitable aiming point without disturbing the laying. The reading on the aiming point selected is then diminished by the reading on the burst if this latter reading was less than 3,200. If the reading on the burst was greater than 3,200 the reading on the selected aiming point is increased by the difference between the burst setting and 6,400. The deflection obtained by making the corrections just indicated is then set off on each sight and each gunner brings his cross hairs on the aiming point selected by traversing the piece. This results in the pieces all being laid on the point of burst of the shot fired. By suitable commands for opening the captain forms the sheaf.

969. Having once formed the sheaf, the captain may change its direction by announcing a new deflection or by the command: **Right (Left), (So much)**. At the command, for example, **Right 30**, each gunner subtracts 30 from his deflection, sets his sight at the new deflection, and brings his vertical cross hair on the aiming point by traversing the piece. Each gunner has then moved the muzzle of his gun to the right through an angle of

30 mils. Similarly, if the command be **Left 30** each gunner adds 30.

970. The direction and distribution may be changed simultaneously. At the command, for example, **1. Left 30, 2. On 1st piece, Close 5**, each gunner first adds 30, and then applies the deflection difference (965). Having set off his correct deflection, each gunner brings his vertical cross hair on the aiming point by traversing the piece.

971. In order properly to distribute the fire, it is sometimes necessary to change the deflection of a single piece while leaving the others unchanged. The captain commands, for example, **(Such) piece, Right (Left), (So much)**. The deflection of the designated piece only is changed as indicated in the command.

FIRE FOR ADJUSTMENT; FIRE FOR EFFECT.

989. It is usually impossible to determine before firing the exact laying which will certainly give hits on the target. It is therefore necessary to correct the laying according to the captain's observation of the bursts with reference to the target. The first part of the fire at any target is accordingly conducted so as to facilitate observation. Such fire is called **fire for adjustment**.

990. The fire must always be adjusted in direction, in distribution, and in range. In time fire the height of burst must also be adjusted.

As a rule, the direction, distribution, and height of burst may be quite accurately observed and adjusted by making changes in the deflection, deflection difference, and corrector. Adjustment of the range is more difficult. It is usually impossible to determine a single range which will surely give hits on the target. On this account it is generally best to determine two ranges, one of which gives bursts short of the target and one of which gives bursts beyond the target. The determination of these two ranges is called **bracketing the target**. The difference between the two ranges is called the **bracket**.

991. Having obtained the adjustment, fire is opened at ranges and, in time fire, at a height of burst which will surely give hits on the target. This is called **fire for effect**.

METHODS OF FIRE.

995. The methods of fire are **fire by salvo, volley fire, volley-fire sweeping, and fire at will**. The use of salvos and volleys is habitual and both natures of fire are ordinarily used in firing at each target, particularly in time fire. Volley-fire sweeping is employed during fire for effect. Fire at will is exceptional, being used only for the close defense of the guns.

SALVOS.

996. The command for a battery salvo is: **Battery right (left)**. Upon the command **fire** by the executive the pieces are fired, at the command of the gunners, in order from the right at intervals of about two seconds.

997. The command for a platoon salvo is: **Right right (left), or, Left left (right)**.

The first word of the command designates the platoon which is to fire.

If the command be **right right (left)** the first and second pieces only are loaded. Similarly, if the command be **left left (right)** the third and fourth pieces only are loaded.

The second word of the command indicates the flank from which the pieces designated are to be successively fired. Upon the command **fire**, by the executive, the pieces designated are fired, at the command of their gunners, in the order indicated at an interval of about two seconds.

998. The interval of two seconds may be increased by cautioning, after the command for the salvo, **At (so many) seconds**. The interval thus prescribed will be used as long as salvos are fired until another interval is announced.

999. Occasionally it may be desirable to fire each piece at the specific command of the captain. The captain cautions: **At my command**. Each piece is then fired upon the command by the captain: **No. (So-and-so) Fire**, each gunner repeating the command **fire** when his piece is designated.

1000. In certain cases it may be desirable to fire a single piece. The captain commands: **(Such) piece only**. The designated piece only is loaded and it is fired upon the command **fire** by the executive.

1001. When the method of fire is by platoon salvo ~~or by~~ piece, the gun squads of the pieces which are not to take part in the firing keep all the instruments set and the pieces laid in accordance with the commands. All the guns are thus able to open fire immediately. To change from platoon salvos, or fire by single piece, to battery salvos, the command is: **Battery right (left)**. All of the pieces take up the first in succession from the flank indicated.

1002. Salvos are particularly suitable for fire for adjustment on account of the facility with which the bursts may be observed.

VOLLEY FIRE.

1003. The command for battery volleys is: **Battery (So many) rounds**. Upon the command fire by the executive, each piece fires the designated number of rounds as rapidly as possible consistent with accuracy and without regard to the other pieces. To make certain that the correct number of rounds is fired, each No. 4 as he loads the piece calls out the range and the number of the round. As the last round ordered is loaded, he adds: **Last round**. Thus, the command being **Battery 3 rounds, 3200**. On loading the first round, each No. 4 calls **3200, One**; on loading the second round, each No. 4 calls **3200, Two**; **Last round**.

1004. In exceptional cases it may be desirable to use one platoon only in volley fire. In such cases the command is: **Right (Left), (So many) rounds**. Only the pieces in the designated platoon are loaded and fired.

1005. Volley fire is particularly suitable for fire for effect on account of the rapidity with which it may be delivered.

VOLLEY-FIRE SWEEPING.

1006. The purpose of sweeping is to distribute the fire over a wide front. It consists in changing the direction of each piece between shots.

This may be accomplished mechanically by a full turn of the traversing handwheel between rounds if there is not material lost motion in the mechanism. Or, if the reticule of the panoramic sight is provided with a horizontal scale, the line of sight may be shifted through an appropriate angle.

1007. The commands for sweeping are: **Battery (So many) rounds, sweeping, or, Right (Left), (So many) rounds, sweeping.** The execution is the same as that of volley fire (1003-1005) in every respect, except that after the first and each succeeding round of the sweep the gunner traverses the piece to the left by one full turn of the traversing handwheel, disregarding accurate laying in direction; or, if the reticule of the sight has a horizontal scale, instead of turning the handwheel he shifts the line of sight 10 mils to the left for ranges up to 2,500 yards, 5 mils for ranges exceeding 2,500 yards (1376-1380).

As soon as the last round of the sweep has been fired, the gunner traverses the piece back to the right until the line of sight is again on the right of his portion of the target or on the aiming point.

FIRE AT WILL.

1008. For the very close defense of the guns the command is: 1. **Target (So-and-so), 2. FIRE AT WILL.** At this command sights are set at deflection zero and range 1000. Fuze setters are set at corrector 30 and range zero. Shrapnel only are used. Each gun is loaded and laid on the target. Upon the command **fire** by the executive, each gun is fired as rapidly as possible until the command **cease firing** or until the target disappears or actually reaches the gun. In fire at will, the gunner neglects all refinements of laying, rapidity in this case being of more importance than great accuracy.

CLASSES OF TARGETS.

1009. Targets are classified with reference to their nature as **artillery, infantry, machine guns, etc.** They are also classified according to their movement, or power to move, as **fixed or stationary, transient, and moving.** All of these may, of course, vary as to size and as to degree of movement.

1010. **Fixed, or stationary, targets** are targets which are fixed to their position for at least a considerable time. Examples of such targets are buildings, trenches, artillery in position, troops held under cover by fire.

Transient targets are those which while fully exposed to fire are likely to remain so for a very brief time. Examples of

such targets are infantry skirmish lines, machine guns, observation parties.

Moving targets are those which are changing their location. Examples of slowly moving targets are large bodies of troops on the march, infantry whether on the march or advancing to the attack, wagon trains on the march. Examples of rapidly moving targets are artillery at fast gaits, charging cavalry, cavalry at fast gaits, small bodies of mounted men, motor cars.

FIRING DATA AND THEIR COMMUNICATION TO THE GUN SQUADS.

1016. The firing data embrace all the information and commands necessary to enable the gun squads to accomplish the orderly, rapid, and accurate service of the pieces. To this end it is essential that the firing data be communicated to the guns in an habitual sequence. First place must be given to the element of the data most essential to commencing the service of the pieces. The sequence should favor as far as possible the completion of one operation by a particular member of the gun squad before he is required to take the data for another.

1017. The necessary data for indirect laying in their habitual sequence are—

1. The designation of the aiming point.
2. The deflection.
3. The deflection difference.
4. The site.
5. The kind of projectile (corrector, shell, or percussion shrapnel).
6. The method of fire.
7. The range.
8. The command, by the executive, fire.

1018. The necessary data for direct laying in their habitual sequence are—

1. The designation of the target.
2. The deflection.
3. The kind of projectile (corrector, shell, or percussion).
4. The method of fire.
5. The range.
6. The command, by the executive, fire.

1019. Fire at will being an exceptional and special method, in which the sight and the fuze setter have fixed settings (1008), and direct laying with shrapnel is always used, the only firing data necessary are the designation of the target, the method of fire, and the command fire.

1020. It is generally possible to communicate certain items of the data before the moment for opening fire. For example, in indirect laying the aiming point may be designated and the approximate deflection and the deflection difference announced as soon as the guns are established.

1021. Except when the captain is near enough to the battery to make his voice heard by all the gun squads, the executive repeats all the firing data. Without awaiting any signal or command from the captain, the executive gives the command fire at such time after the range is announced as will insure the orderly delivery of the fire. If the captain desires to give a range without opening fire, he cautions **Do not load** before announcing the range. To load and fire he again announces the range. To suspend the fire at any time the captain commands or signals: **Cease firing**. The firing is stopped and all of the pieces are unloaded but are kept laid with the last data received. The signal for cease firing is a prolonged blast on the whistle with the right arm raised vertically until the signal is obeyed.

1022. Each gunner gives the command fire so that his piece will be fired at the proper time after the command fire by the executive. No other item of the firing data is repeated unless it is called for. When a member of a gun squad does not understand any item of the firing data he asks his chief of section for it, thus, **Site? Corrector?** etc. (950).

1023. The complete firing data (1015-1018) are always necessary before firing the first salvo or volley after occupying a position. After the first salvo or volley the captain announces only so much of the data as he desires to change, except that the range is always given as a definite signal to load and for the executive to give the command fire at the proper time.

In firing shell or percussion shrapnel each piece is loaded as soon as it is fired; but the range is nevertheless given as a

definite signal for the executive to give the command fire at the proper time.

1024. In the exceptional cases in which the captain causes each piece to fire at his command, the executive repeats the command: No. (So and so) Fire, unless the captain is near enough to the guns to make his voice heard by all the gun squads. Each gunner cautions fire at the proper time.

COMBINED DUTIES OF THE MEMBERS OF THE GUN SQUADS.

1025. The duties of individuals in the gun squad are not independent but are closely related. Teamwork is essential to rapidity and accuracy of fire and, therefore, to its effectiveness. Each man must exactly perform his functions without interfering with other men. Each must cooperate with and assist the others in every practicable way.

1026. To attain a high quality of teamwork the most necessary requisite is a profound knowledge by each man of his own functions and facility in executing them at high speed, reinforced by a thorough understanding of the duties of each of the other members of the gun squad.

1027. In the first combined drills it is advisable to explain exactly what each man does after the announcement of each item of the firing data. After this explanation the men should be required to perform their duties precisely but slowly. As the instruction progresses, they are urged toward greater rapidity without sacrifice of precision. When the squads are working smoothly as units, the explanations are omitted. Finally the firing data are announced with as great rapidity as is consistent with distinct enunciation.

1028. In indirect laying it is not necessary for the gunner to set the range exactly. During direct laying the exact setting of the sight for range is essential. Rapidity on the part of the gunner in traversing the piece to the center of its traverse when the trail is to be shifted in indirect laying facilitates the work of the chief of section. Similarly, for direct laying at moving targets the work of No. 2 is greatly facilitated if the gunner, when the trail must be shifted, rapidly traverses the gun as far as it will go in the direction opposed to that in which the target

is moving. The gunner must not interfere with the elevating mechanism in indirect laying.

1029. No. 1 helps No. 4 by opening the breech before the gun has returned into battery and by seeing that the block remains fully away from the breech. No. 1 must not interfere with the elevating mechanism during direct laying.

1030. As soon as the battery goes into position prepared for action, No. 5 inserts a round of shrapnel in the fuze setter and sets the fuze; thereafter, he inserts another round and sets the fuze as soon as the fuze setter is empty. Whatever the kind of fire, he always has, during firing, a round of ammunition in his hands ready, in the case of time fire, to insert it in the fuze setter and set the fuze, or, in the case of percussion fire, to pass it directly to No. 4. No. 4, in percussion fire, loads the piece immediately after the breech has been opened. To this end, as soon as he has taken a round of ammunition from No. 5, he stands at the breech ready to load as soon as it has been opened. He takes care that no part of his body shall be in the way of the gun during recoil. In volley fire with time shrapnel, when more than one round is to be fired, No. 4, after giving the final setting to the fuze, stands ready as in percussion fire to load each round after the first.

1031. Whenever No. 2 requires assistance in shifting the trail, the chief of section designates the cannoneers who are to assist and the places at which they are to work.

1032. The gunner and all cannoneers who have scales to set verify their readings immediately after each shot. The gunner and No. 1 also immediately relay the piece with the settings of the previous round unless new data are received before they have time to do so.



